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JAMES WHITE

Commission of Conservation
CANADA

*COMMITTEE ON FISHERIES, GAME AND
FUR-BEARING ANIMALS*

FUR-FARMING IN
CANADA

By

J. WALTER JONES, B.S.A.



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Committee on Fisheries, Game and
Fur-Bearing Animals

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DR. J. W. ROBERTSON

HON. W. R. ROSS

OTTAWA, Jan. 23, 1913.

Sir:

I have the honour to transmit herewith a report on fur-farming in Canada.

Your obedient servant,

JAMES WHITE,
Secretary

HON. CLIFFORD SIFTON,
Chairman,
Commission of Conservation

TO FIELD MARSHAL HIS ROYAL HIGHNESS PRINCE ARTHUR WILLIAM
PATRICK ALBERT, DUKE OF CONNAUGHT AND OF STRATHEARN,
K.G., K.T., K.P., &c., &c., GOVERNOR-GENERAL OF CANADA

May it Please Your Royal Highness:

The undersigned has the honour to lay before Your Royal Highness
a report on fur-farming in Canada.

Respectfully submitted,

CLIFFORD SIFTON,
Chairman

OTTAWA, Jan. 24, 1913.

Contents

	PAGE
I. INTRODUCTION.....	1
II. EARLY ATTEMPTS TO DOMESTICATE THE FOX.....	13
III. MANUAL OF FUR-FARMING.....	
COMMON RED FOX:	
THE SCIENCE OF BREEDING.....	16
RANCHING PRACTICE.....	25
FINANCIAL ASPECTS.....	48
POLAR OR ARCTIC FOX:	
BLUE FOX FARMING.....	56
BLUE FOXES OF THE PRIBILOF ISLANDS.....	60
RACCOON.....	70
WEASEL FAMILY:	
MINK.....	71
MARTEN OR AMERICAN SABLE.....	78
FISHER, PEKAN OR PENNANT MARTEN.....	79
CANADIAN OTTER.....	80
SKUNK.....	85
RODENTS:	
MUSKRAT.....	89
BEAVER.....	90
REINDEER AND MOOSE:	
THE REINDEER IN CANADA.....	92
MOOSE.....	95
IV. PREPARING SKINS FOR MANUFACTURE.....	96
V. THE COMMERCE IN RAW FURS	
CENTRES OF THE FUR TRADE.....	104
PRICES OF SILVER FOX SKINS.....	109
VI. APPENDICES	
I. VALUE OF WILD ANIMALS.....	115
II. EXPERIENCE IN RAISING VIRGINIA DEER.....	117
III. SELECTED ARTICLES FROM AMERICAN BREEDERS' ASSO- CIATION REPORTS:	
OBJECTS OF BREEDING WILD MAMMALS.....	119
EXOTIC SPECIES FOR DOMESTICATION.....	120
BREEDING OF THE WAPITI.....	122
BREEDING THE VIRGINIA DEER.....	123
BREEDING FUR-BEARING ANIMALS.....	125
IV. REINDEER PROGRESS IN ALASKA.....	131
V. CANADIAN LEGISLATION RESPECTING FUR-FARMING...	135
VI. STATISTICS OF FUR PRODUCTION.....	138
VII. STATISTICS OF FUR PRICES.....	146
VII. INDEX.....	161

ILLUSTRATIONS

I.	SITTING ON THE BOX IN WHICH HE MADE A RAILWAY JOURNEY.....	<i>Frontispiece</i>
II.	FULL-FURRED FOXES.....	13
III.	RANGE OF RED FOXES IN CANADA (<i>Map</i>).....	16
IV.	RED, CROSS AND SILVER FOXES.....	20
V.	A MATED PAIR OF SILVER FOXES.....	25
	FOX PEN IN THE MAPLE WOODS.....	25
VI.	THE BEST LOCATION FOR A RANCH IS IN A WOODLOT.....	26
VII.	DETAIL OF FENCE CONSTRUCTION WITH SHEET IRON.....	28
	DETAIL OF FENCE CONSTRUCTION—AN ALLEY AROUND EACH PEN....	28
VIII.	USUAL TYPE OF KENNEL AND PEN.....	33
	CHEAP KENNEL CONSTRUCTED FROM A PACKING BOX.....	33
IX.	FLOOR PLAN AND VERTICAL SECTION OF A FOX KENNEL.....	34
X.	PLAN OF TWO GOOD TYPES OF FOX RANCHES.....	36
XI.	FOXES OF VARIOUS AGES AND ATTITUDES.....	40
XII.	RANGE OF RACCOONS IN CANADA (<i>Map</i>).....	70
XIII.	RANGE OF MINKS IN CANADA (<i>Map</i>).....	72
XIV.	MINK RANCH AT LAC CHAUD.....	74
	MINK'S DEN, ARTIFICIAL.....	74
XV.	RANGE OF THE AMERICAN MARTENS IN CANADA (<i>Map</i>).....	78
XVI.	MINK SITTING ON HIS HOUSE.....	82
	OTTER.....	82
XVII.	RANGE OF SKUNKS IN CANADA (<i>Map</i>).....	85
XVIII.	BEAVER.....	86
	LIVE SKUNKS—LONG STRIPED.....	86
XIX.	RANGE OF MUSKRATS IN CANADA (<i>Map</i>).....	89
XX.	RANGE OF THE AMERICAN BEAVER IN CANADA (<i>Map</i>).....	90
XXI.	STRETCHING BOARDS.....	98
XXII.	A COLLECTION OF 34 WILD SILVER FOX SKINS, WORTH UPWARDS OF \$21,000.....	110
XXIII.	T. R. H. DUKE OF CONNAUGHT AND PRINCESS PATRICIA IN SAINT PATRICK RANCH.....	126



SITTING ON THE BOX IN WHICH HE MADE A RAILWAY JOURNEY—SEPTEMBER FUR

FUR-FARMING IN CANADA

I. Introduction



UR-FARMING is a new industry in Canada, but its development has been rapid. An investigation conducted in the latter half of 1912 revealed numerous instances where animals of various species were being bred in captivity for their fur. Foxes, of two species and of all colour varieties, skunk, mink, raccoon, fisher, beaver and muskrat were found upon fur-farms. The marten and otter are likewise being domesticated for their fur. In one instance even the wild cat was retained in captivity for breeding purposes, and it is authentically reported that the common black house-cat is being bred for its fur on pioneer Ontario farms. Up to the present time the domestication of wild fur-bearing animals has been practised most extensively, and also most successfully, in the Maritime Provinces; but the industry is developing rapidly in Ontario and Quebec, while isolated fur-farms are also to be found throughout the Western Provinces.

The great interest manifested in fur-farming is to be ascribed to the remarkable success attained in breeding silver and other colour phases of the fox common to Eastern Canada. The black and dark silver skins from foxes produced on Prince Edward Island ranches have rarely brought less than five hundred dollars each, and frequently bring over two thousand dollars at London auction sales. The pioneer fox breeders have acquired wealth in the business and their success has inspired their neighbours to engage in a similar line of work. Naturally the price of breeding stock, responding to the increased demand, has risen to many times the fur value, so that the ownership of even a pair of silver foxes is impossible to the average farmer.

Corporations and partnerships with a total capitalization of several millions have been established for farming the silver fox. A large proportion of the inhabitants of Prince Edward Island and a smaller proportion of those of New Brunswick and Nova Scotia have invested their money, sometimes even mortgaging their property, to buy stock in these enterprises. Others have attempted to breed fur-bearing animals which require less capital for foundation stock. Thus, in 1912, more than a thousand red and blue foxes were imported into the Maritime Provinces. Mink, skunk and raccoon are being experimented with. The faith exhib-

ited in the breeding of fur-bearers, particularly in Prince Edward Island, has advanced prices there above those obtained in any other part of the world. Canada and the United States are being searched for fur-bearers for shipment to Prince Edward Island ranches. Fox companies incorporated elsewhere establish their ranches there where the farmers have a thorough knowledge of the rather difficult art of breeding, and the consequence is that fully 85 per cent. of all foxes in captivity are to be found in the island province.

The high prices for furs prevailing during recent years explain why fur-farming has made such rapid progress in such a short time. This is particularly true of the black fox industry. The *fur-value* of a high-grade black fox ranges from about \$500 to about \$2,500; but the demand for breeders has been so great that the price has risen to \$25,000 a pair for the best quality of breeding stock. Moreover, the promoter has entered the field and companies are being floated whose capitalizations are based on these high prices and rosy expectations of profits. Although there is ample basis for a sound industry in fox-farming, it is necessary that the general public should realize that the industry is becoming a highly speculative one, and that the individual who puts his money in companies loaded with a heavy burden of capitalization assumes a great risk.

Since the fur-farming industry is so intimately connected with the present high prices of furs, it will be worth while to enquire into the causes of these high prices and endeavour to forecast to what extent they will continue to operate.

DEMAND AND SUPPLY

Scarcity of Furs	Stated in general terms, fur has become scarce because less is produced and more is used than ever before. The remarkable increase in the demand for costly furs in the past twenty years is due to a combination of causes. The population is growing. The relative number of people in the wealthy classes is increasing. The habits of travelling extensively and of living in metropolitan centres are rapidly increasing. Commerce and more efficient salesmanship have introduced furs all over the world, so that their admirers and users are multiplied. Dame Fashion, whose influence is predominant everywhere, is responsible for a very heavy demand for certain kinds, and only the best and scarcest are in high favour with her. Then, too, our growing cities, which multiply the opportunities for gatherings and concourses, especially of the well-to-do classes, engender competitive habits in choosing personal adornments.
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The growing use of the automobile and the more general habit of living out-of-doors have made furs almost a necessity. In America alone, the valuation of automobiles is now over 1,500 million dollars, and a proper equipment for the luxurious vehicles and their occupants necessitates the use of many millions of dollars worth of furs and leather. Better roads, more extensive travel, and cheaper automobiles are important factors in determining the growing demands for fur and pelts generally.

Instruments of Destruction Some kinds of animals must soon be exterminated if the keenness of the hunt for them is maintained. When dead-falls, snares and the bow and arrow were used in hunting there was a chance for the game to escape; but with modern guns, smokeless powder, improved traps, and the most alluring baits and scents that modern chemists can compound and trappers invent, there are fewer opportunities. Coupled with increased efficiency of destructive gear is the general diffusion by railroads, steamship lines and hunting and trapping magazines, of knowledge respecting game resorts and the hunter's art.

Improvement of Travelling Facilities Railroads and steamship lines are tapping new territory, corps of guides are organized, canned food and better camping equipment make the hunter's life more enjoyable, and the result is that the uttermost sanctuaries of the fur-bearers are invaded. Their last retreats have been made and they must now slowly diminish in numbers year by year. The musk-ox, for instance, has figured in the London sales only for the past forty years because, before that time, Arctic hunters were unable to reach its habitat. Continued invasion of its territory may lead to its extinction.

Close Seasons The usual methods employed to prevent the complete extinction of a species is to establish a close season. Recently, a close season of three years was declared for the Russian sable to allow it to recuperate in numbers in Siberia. The chinchilla has similar protection in Bolivia, and the Canadian beaver is frequently protected in a similar way. A close season of five years is also provided for the Alaska seal. The general decrease in the numbers of fur-bearers during the past twenty years indicates how inefficient are the preventive methods employed.

Destruction of Haunts The ever-expanding areas of human settlements have caused some kinds of fur-bearers to retreat farther into the woods. The clearing away of the forests and the grazing of the natural covers by domestic animals have destroyed their haunts and exposed them to their enemies. Draining swampy areas has

destroyed the homes of the muskrat or musquash, the mink, the otter and the beaver. The fisher and marten never seem to exist long near man's habitation. Even the fox, which appears to increase near settlements, will decrease if the forests are wholly removed or burned.

INCREASING PRICES OF PELTS

(Statement Based on the London Sales of C. M. Lampson & Co., by Alfred Fraser, New York.)

KIND OF SKIN	PERCENTAGE INCREASE IN PRICES		
	1892-1901 over 1882-1891	1902-1911 over 1892-1901	1892-1911 over 1882-1891
Fox, silver.....	155	55	300
" cross.....	10	100	125
" red.....	85	85	245
" blue.....	20*	145	100
" white.....	120	100	350
Marten, pine.....	470	15	580
Fisher or pekan.....	0	430	430
Mink.....	60	150	300
Skunk.....	20	110	150
Muskrat.....	0	230	230
Lynx.....	25	130	200
Otter, land.....	30*	170	80
" sea.....	110	65	240

* Decrease.

DECREASING NUMBER OF PELTS

(Statement Based on the London Sales of C. M. Lampson & Co., by Alfred Fraser, New York.)

KIND OF SKIN	PERCENTAGE DECREASE IN NUMBERS		
	1892-1901 over 1882-1891	1902-1911 over 1892-1901	1892-1911 over 1882-1891
Fox, silver.....	10	45	50
" cross.....	5	65	70
" red.....	53	2	55
" blue.....	34†	40	23
" white.....	750†	25	510†
Marten, pine.....	65†	55	20
Fisher or pekan.....	5†	95	95
Mink.....	75†	55	20
Skunk.....	30†	55†	110†
Muskrat.....	250†	10	215†
Lynx.....	3800†	80	700†
Otter, land.....	45†	30	5†
" sea.....	65	50	85

† Increase.

NOTES ON THE TABLE.—1. The increase in the price of pelts during the past twenty years has been general.

2. All pelts, except those of skunk, have decreased in numbers during the past ten years.

3. Pelts considered of little value twenty years ago are being hunted to the verge of extinction; *e.g.*, fisher, lynx, marten, mink, cross fox, and even muskrat, show signs of failing.

4. The increase in numbers of pelts fifteen years ago was caused by keener hunting. This was inspired by the rising values.

The extent to which these influences have diminished the number of furs marketed is well put in the *Fur News Magazine*, for November, 1912, which says:

"We present elsewhere in this issue a record of the collection of all fur skins centreing at London, and the majority are sent there, for the years 1911 and 1912, both secured under the terrific pressure of a strong demand and record-breaking prices which induced strenuous and persistent trapping to the limit—and past good business judgment.

"The figures are remarkably interesting, and definitely serious as showing the marked decrease in quantity straight down the column with rare and insignificant exceptions; in most instances the declines are very great and invite careful attention, particularly as it is perfectly true that every possible effort was made the country over to effect the opposite result, and which surely would have been noted if the fur-bearers were present in usual numbers in their customary haunts or new and unusual retreats. The few exceptions, where there is an increase instead of a decrease, include cross fox and fisher, both of which were so high in value that it paid better to catch one a week rather than waste time catching other animals twice a day every day; but the total increase for both is only thirty-two hundred for the entire year and country; wolf is the only other fur of moment showing an increase in catch over 1911, and the difference is due to a general impulse to effect extermination, and not to the fact that there were more wolves than in the preceding year. Not a few 1911 skins were held back and came forward in this year's sales.

"A study of the figures further shows the same general decrease in collections of Russian, German, Japanese and Australian skins. Every fur skin caught *anywhere* this year will have a value and not a skin should be sacrificed."

SUPPLYING THE DEMAND

**A Domestic
Fur-Bearer**

Confronted with this condition of a decreasing supply and an increasing demand, the fur trade has done its utmost to bridge the gap by encouraging the use of furs of domestic animals, by diverting a part of the demand to serviceable but less costly furs and preparing imitations of the more costly varieties. About thirty years ago, Russian furs came into vogue, when Persian lamb broad-tail and astrachans began to be used extensively. This development is of great significance, as the demand for the above-mentioned furs has increased enormously in recent years and the supply to-day is greater than ever because they are produced by domestic animals bred intelligently under a husbandman's care. If the marten, mink, fox and otter had been domesticated a score or more years ago, it is probable that the production of their fur would have served already as a counterpoise to the monopolies enjoyed by Russia and Germany in the production and dressing of astrachans and Persian lambs.

**Popularizing
Less Costly Furs**

When the perennially fashionable sable, ermine, chinchilla and silver fox did not supply the demand, the Persians, broadtail and seal became more costly. Gradually, too, from its plebeian rank of coat lining at fifty cents a skin mink was adopted into the select family of valuable furs, closely preceded by marten and, latterly, followed by fisher and cross fox. To take the place of mink as a coat lining, muskrat or musquash was chosen, sharing this promotion with the less valuable marmot and hamster of Europe. To supply the demand for a medium-priced black fur of beauty, a common animal, the skunk, has been chosen. The black domestic cat, known to the trade as 'genet', is also utilized to meet the demand for black furs, while northern hares are extensively manufactured into 'Baltic fox' or 'white fox' or 'black lynx.'

**Renaming
Furs**

When the fur dressers and dyers produced a clipped and dyed muskrat skin that resembled sealskin almost perfectly, it was found that it would not sell under its real name because it was a common fur, used largely by the poorer classes. Consequently a name was invented for it and this popular and high-priced fur is now sold as 'Hudson Bay seal'. The fur of the coney, a very cheap and common animal in France, is the raw product in producing 'electric sealskin', 'clipped seal' and 'Baltic seal'. Raccoon, when first introduced, was cheap and was in little demand, but when given the name 'Alaska bear' and 'silver bear' it immediately came into favour. Skunk, which is an excellent fur of a dark hue, though beauti-

ful and durable, could not be sold as skunk, but, as 'black marten', and 'Alaska sable', it is in high favour and likely to remain in the class of the medium and higher priced furs. It is worth remarking that, since the prejudice against the muskrat, skunk and other cheap furs has been overcome, they can be sold under their real names. Muskrat backs are now sold as 'rat' fur at as high figures as the dyed product.

Imitations and Misnaming The pressure of increasing demand has brought into common use the fur of animals with harsh brittle hair of any colour, which is sold under names which mislead the public. Thus, the pelts of animals from the warmer zones such as Chinese goat, Thibet lamb, Manchurian dog, hamster, marmot, Tartar pony, opossum, raccoon, weasel, jackal fox, monkey, antelope, otter and many others are now worked up by dressers and dyers into very respectable-looking furs. They are inferior, however, to the furs from colder climates in suppleness of leather, closeness of underwool, fullness of overhair and silkiness of hair and, because they are dyed, they are less durable and less popular.

Misnaming and Deceptions The misnaming of furs has caused the London Chamber of Commerce to give notice that misleading terms are not to be used and that offenders are liable to prosecution under the Merchandise Marks Act, 1887. Even in the early days when misnaming was in its infancy, the manufactured furs were frequently misnamed as follows:

Muskrat or musquash, pulled and dyed.....	Seal
Nutria, pulled and dyed.....	Seal
Nutria, pulled and natural.....	Beaver
Rabbit, sheared and dyed.....	Seal
Otter, pulled and dyed.....	Seal
Marmot, dyed.....	Mink or sable
Fitch, dyed.....	Sable
Rabbit, dyed.....	Sable or French sable
Hare, dyed.....	Sable, fox or lynx
Muskrat, dyed.....	Mink or sable
Wallaby, dyed.....	Skunk
White rabbit.....	Ermine
White rabbit, dyed.....	Chinchilla
White hare, dyed or natural.....	Fox, foxaline
Goat, dyed.....	Bear or leopard

But, if laws were necessary twenty-five years ago to protect the public from frauds, what must be the necessity at the present time when two hares brought up by the same mother may pose on the same counter, as 'white fox' and 'black lynx,' respectively?

COMMISSION OF CONSERVATION

The following is a list of common misdescriptions:

VARIETY	SOLD AS—
American sable.....	Real Russian sable
Fitch, dyed.....	Sable
Goat, dyed.....	Bear
Hare, dyed.....	Sable or fox
Kid.....	Lamb or broadtail
Marmot, dyed.....	Mink, sable or skunk
Mink, dyed.....	Sable
Musquash (muskrat), dyed.....	Mink or sable
Musquash, pulled and dyed.....	Seal, electric seal, Red River seal or Hudson seal
Nutria, pulled and dyed.....	Seal, electric seal, Red River seal or Hudson seal
Nutria, pulled, natural.....	Beaver and otter
Opossum, sheared and dyed.....	Beaver
Otter, pulled and dyed.....	Seal
Rabbit, dyed.....	Sable or French sable
Rabbit, sheared and dyed.....	Seal, electric seal, Red River seal, Hudson seal and seal musquash
Rabbit, white.....	Ermine
Rabbit, white, dyed.....	Chinchilla
Wallaby, dyed.....	Skunk
White hare.....	Fox and other similar names
Dyed furs of all kinds.....	Natural
White hairs inserted in foxes and sables....	Real or natural furs

The following list has been published by the London Chamber of Commerce as permissible descriptions:

NAME OF FUR	PERMISSIBLE DESCRIPTION
American sable.....	Canadian sable or real sable
Fitch, dyed.....	Sable fitch
Goat, dyed.....	Bear goat
Hare, dyed.....	Sable hare or fox hare
Kids.....	Karakule kids
Marmot, dyed.....	Sable marmot, mink marmot or skunk marmot
Mink, dyed.....	Sable mink
Musquash (muskrat), pulled and dyed....	Seal musquash
Nutria, pulled and dyed.....	Seal nutria
Nutria, pulled, natural.....	Beaver nutria or otter nutria
Opossum, sheared and dyed.....	Beaver opossum
Otter, pulled and dyed.....	Seal otter
Rabbit, dyed.....	Sable coney
Rabbit, sheared and dyed.....	Seal coney or musquash coney
Rabbit, white.....	Mock ermine
Rabbit, white, dyed.....	Chinchilla coney
Wallaby, sheared and dyed.....	Skunk wallaby
White hare.....	Imitation fox or mock fox
White hairs inserted in foxes or sables....	Pointed fox or sable

**Frauds in
Selling Furs** Reliable furriers, however, do not use the deceptive names mentioned above. Many of the smaller furriers are doubtless ignorant of the real names of their stock; but cheap advertisers are frequently guilty of misnaming. Many advertisers giving private addresses mislead the public; when a lady who is 'going South' offers her new \$150 Russian lynx set for \$25, the conclusion may readily be reached that it is 'doctored' rabbit. However, the enterprise of furriers should not be wholly discouraged, as, otherwise, owing to the scarcity of really good fur, many ladies would have to appear in worsted scarfs and mitts for six months of the year. The pride they take in their 'ermine', 'foxes', and 'chinchillas' and in their bargain 'fishers' and black 'marten' would probably be diminished if they knew they were only 'doctored' rabbit, opossum and wallaby.

**Hunter-Trapper
Age Passing** All these artifices of the fur dresser and the fur dealer have failed, however, to compensate for the decreasing supply of fur of good quality. One fact stands out prominently: the hunting and trapping of wild fur-bearing animals must give place to their domestication if the demand for furs is to be satisfied.

The hunter-trapper age has passed its zenith. With the demand exceeding the possible supply, more economical methods must be introduced and the supply must be increased. The tearing up of trapped animals by carnivorous mammals before the trapper can reach the traps is common and represents a great loss. The killing of animals whose pelts are not in prime condition represents a large annual loss of valuable fur. These and other wastes are eliminated when fur-bearers are domesticated.

**Domestic
Fur-Bearers** The first step towards raising animals for their fur was taken years ago when karakule sheep—a domestic animal from which the Persian lamb and broadtail are obtained—began to be bred for its pelt. Up to recent years this animal was the only example of a valuable fur-bearer in captivity. It is a domestic animal merely, but, because of the difficulties in travelling, in language in knowledge of good stock, in quarantine laws and in remoteness of the district in which they flourish, it would be very difficult to secure specimens for breeding purposes. Latterly, exceedingly optimistic reports of successes in karakule 'crosses' in Germany and the United States have been reported. If the Persian lamb can be produced in

America, millions of dollars will be saved annually, as the use of this lasting and handsome fur is increasing steadily. That the business is regarded in Russia as an important one, is indicated by the calling of a convention of breeders at Moscow (October, 1912), at the Czar's special request. As a possible source of future fur supply, the karakule crossed with lustrous woolled sheep like Lincolns and Cotswolds appears to be one of the most promising. Experiments made recently have produced lamb skins of magnificent gloss and curl.

Domesticating Fur-Bearers Despite the progress that has been made in breeding karakule sheep, it must be acknowledged that domestication of fur-bearing animals has, thus far, failed to supply the demand for pelts which are highly valued for fur. The increasing demand and the ever-decreasing supply of desirable fur pelts is producing a state of trade that would be alarming were it not for the possibilities of domesticating and breeding other fur-bearers. The time has come when, on account of the high range of prices, every effort should be made to domesticate all wild fur-bearing animals of considerable value.

There is a broad field for activity in this direction. According to Lantz' estimate, there are about five thousand species of mammals at present inhabiting the earth. About twenty-three of these are in a state of domestication, serving man as beasts of burden or furnishing food, clothing, or companionship.

The hoofed animals (*ungulata*) comprise:

The Asiatic elephant, horse, ass, hog, camel, dromedary, reindeer, goat, sheep, yak, buffalo (two species), ox (two species), and llama (possibly four species).

The flesh-eating animals (*carnivora*) comprise:

The cat, dog, ferret and cheetah or hunting leopard of India.

The rodent animals (*rodentia*) comprise:

The rabbit and the guinea pig.

The Arctic fox (*vulpes lagopus*) and the common fox (*vulpes vulpes*) may be classed as domestic, as for twenty years they have been nurtured under man's care, and the rising prices of fur will probably make the industry permanent.

THREE ORDERS OF WILD CANADIAN MAMMALS AND THEIR ECONOMIC USES

Order	Family	Species	Parts of Economic Use
Hoofed Animals (hoofed; large)	Deer	Elk	Flesh, hide, trophies
		Deer	" " "
		Moose	" " "
		Caribou	" " "
	Cattle	Bison or Buffalo	" " "
Rodent (no canine teeth; 4 incisors only, except in rabbit)	Squirrel	Squirrel	Pelt, flesh
		Chipmunk	Pelt
		Woodchuck	"
	Beaver	Canadian Beaver	Pelt, flesh, castors
		Mice	
	Mouse	Voles	
		Lemming	
		Muskrat	Pelt, flesh
		Hare	Flesh, pelt, hair
	Hare	Lynx	Pelt
Carnivora (12 incisors; 4 large canines; shearing premolars)	Cat	Lynx	Pelt
	"	Cat (domestic)	"
	"	Wild cat	"
	Dog	Fox	"
		Wolf	"
	"	Coyote	"
	Weasel (mustelidæ)	Otter	"
		Weasel	"
	"	Mink	"
	"	Marten	"
	" Fisher or Pekan		"
		Wolverine	"
	"	Skunk	Pelt, oil and galls
	"	Badger	Pelt, hair
	Raccoon	Raccoon	Pelt, flesh
	Bear	Bear	Flesh, pelt
	Seal	Fur-seal	Pelt, oil, flesh
		Hair-seal	Pelt, oil

The Precious Fur-Bearers

It is desirable to breed the species producing the most valuable fur rather than those whose fur does not bring such a high price. The sea-otter, the silver fox, the Russian sable and the chinchilla are the precious fur-bearers of modern

times. All of these except the silver fox are now off the market because of a restrictive close season established by law to allow them to recuperate in numbers. None, except the silver fox, is bred in captivity.

The sea-otter, because of its aquatic habits, extreme scarcity and remoteness from populous neighbourhoods, has never been domesticated. The chinchilla, a rat-like animal, found principally in Bolivia, is also being exterminated and no attempt is being made to rear it in pens. The Russian sable has been subjected to a few half-hearted experiments in domestic breeding, but without success. Mr. Vladimir Generosoff, an American agent of the Russian Department of Agriculture, states that no serious attempts to breed the sable will be made by the peasant trappers who are so poverty-stricken that they cannot raise sufficient capital for ranch equipment. He hopes to secure the co-operation of his government in conducting breeding experiments with these valuable animals.

The best sable are found in the forests of the Vitim and Olekma in the province of Yakutsk, one of the remotest parts of Siberia. It is evident that only the Russian authorities can secure a sufficient number of excellent wild specimens to conduct a practical experiment. In the meantime, in preparation for the time when the Russian sable will be available for breeding in Canada, experiments should be conducted with the Canadian sable, which is very closely related to the Russian and very similar in habits.

Because of its ubiquitous character and its fondness for living near human habitations, the silver fox has been subjected to more domesticating experiments than any other valuable fur-bearer. When it became known that it was simply a pelage colour of the common red fox, experiments were multiplied with the cheaper red foxes to gain experience in breeding the species. The breeding of the fox in captivity is proceeding on an increasingly large scale and no doubt exists now regarding the possibility of domesticating it.



A FULL-FURRED FOX, DECEMBER FUR



A FULL-FURRED BLACK FOX, DECEMBER FUR

II. Early Attempts to Domesticate the Fox

IT would be futile to record all the early attempts to rear foxes in captivity and note has, therefore, been made of the experiences of only a few breeders at widely separated points. The experimenters, in most cases, were wholly unacquainted with the experience of others.

It has been customary for trapper-farmers to keep alive foxes caught in warm weather until the fur is prime. Thus, young foxes captured in July are kept until December before being killed. The earliest authentic record obtained of rearing young from foxes kept in captivity comes from Tignish, P.E.I., where Benjamin Haywood reared several litters some thirty-five years ago; but they were destroyed by the parent foxes because they were not kept in seclusion and quiet.

Doubtless there have been, in earlier years, numerous cases that were as successful as Mr. Haywood's, but it is interesting to record this experiment because he was a near neighbour of the men who finally achieved the greatest success in the commercial fox-breeding industry.

Several furriers in Quebec have been connected with breeding experiments. Messrs. Paquet Bros. had a small ranch once at St. Joseph-d'Alma near the head of the Saguenay, which they finally sold. Revillon Frères were interested in a ranch on the North shore of the gulf of St. Lawrence a dozen years ago, but finally abandoned the experiment believing that fox raising was destined to fail. Holt, Renfrew & Co. have a ranch near Quebec and have reared a litter of silver foxes from a pair of exhibition foxes in their menagerie at Montmorency Falls.

In Ontario, Rev. George Clark, of St. Catharines, an experienced breeder of pheasants, bred a litter of reds from a pet pair of wild foxes in 1905. Two ranches were started about 1906, near North Sydney, and on the Lingan Road near Sydney, N.S., respectively; but, after several years they failed to maintain the foxes in breeding condition. These were later sold to Bruce, Cummings, McConnell and others, who have proved to be successful ranchers.

Excellent success in breeding the fox has been achieved by
Quebec Mr. Johann Beetz, at Piastre Baie, North shore, Gulf of
Breeders St. Lawrence, and Mr. T. L. Burrowman, of Wyoming,
Ontario. The former is the scion of a wealthy Brussels family, and his roving spirit led him to Labrador and Alaska on hunting expeditions. He finally settled at Piastre Baie, about 1898, and attempted fox ranching with a pair of silver foxes brought from Alaska. There were trees at several points in the neighbourhood, and at some ten or twelve wooded spots, a hundred or more rods from his dwelling, he kept his pens, having two females and one male at each point. He adopted the

system of double mating. Large quantities of salmon, lobsters and game were caught for food for the foxes, while horse meat was occasionally brought from Quebec city. He augmented his stock with native Quebec wild foxes and conducted feeding experiments with red foxes. Careful selection has improved his strain until they grade dark silver throughout.

Authentic reports state that Mr. Menier, who owns Anticosti island, has attempted to breed foxes there, and has set at liberty silver and patched foxes to grade up the colour of the wild fox.

**An Ontario
Experimenter** Mr. Burrowman is a fur-buyer who, at an early date recognized the possibilities of domesticating fur-bearers. He kept foxes in captivity twenty-two years; but did not successfully rear young to maturity until about ten years ago, because, prior to that time, he kept more than one pair in a single pen. He may be called the father of the Ontario fox-ranching business. The only assistance he obtained was from the late Dr. Robertson of Foxcroft, Me.

**Dalton
and Oulton** The placing of the fox-raising industry on a commercial basis is due to the efforts of Charles Dalton, of Tignish, P.E.I., and his former partner, Robert T. Oulton, formerly of Alberton, P.E.I., but now of Little Shemogue, N.B. Dalton began experimenting about 1887, with red foxes, which he kept in a shed at Nail Pond. Later, he bought two pairs of silver foxes from neighbouring districts and from Anticosti island and continued his experiments with indifferent success for about ten years. During that time, Oulton was also experimenting with foxes, having bought a silver fox from Mr. Gibbs of Lot 5, and a pair of silvers from a Mr. Pope of Anticosti island. All Anticosti foxes were subsequently slaughtered because they did not come up to the requisite standard of quality.

One of their chief concerns was keeping off prying neighbours from their ranch premises. While Beetz had little difficulty with neighbours, the obtaining of a sufficient food supply was a matter that gave no little trouble. Dalton and Oulton were more fortunate in their food supply as the thickly-settled farming country all about them supplied horse flesh and other cheap meat in abundance. Tallow, corn meal, fish, oat-meal, flour and butcher's waste were available in plenty and a very small outlay in cash procured a large supply.

Oulton pursued his work on Savage island, of which he was the sole inhabitant. He managed to impress the public with the necessity of keeping away from his ranch, and his pens, constructed within an outside enclosure a quarter acre in area, were the models for the present system of ranching. Dalton and Oulton joined interests in 1895 or thereabouts, and, together, worked out successfully the present

forms of wire enclosures. In 1897, Dalton built a ranch at Tignish, still retaining a half-interest in the Oulton ranch. He bought and sold skins and generally conducted the fur sales for the district. All Oulton's foxes were sold by Dalton, as well as those of his late partners, James Rayner and others. Dalton also conducted a general correspondence with the fur trade, and imported stock which proved of value for crossing.

**Early P.E.I.
Breeder's**

It was inevitable that enterprising neighbours who guessed how successfully the fox breeding was being carried on would chafe at not being able to participate in such a profitable enterprise. Others soon began to experiment. In 1891, James Tuplin and James Gordon purchased a pair of foxes for \$340, and, to the surprise of Dalton and Oulton, succeeded in rearing young from them in the following season. Silas Rayner was also alive to the situation and though, at first, unable to secure stock of good quality, he learned how to keep foxes successfully and finally secured better stock from Dalton and from Gordon. Frank Tuplin, of Summerside, obtained the foundation stock for his large ranch by securing foxes from his uncle, Robert Tuplin. It is probable that the pelt value of foxes owned by the above mentioned individuals and their inheritors at the present time aggregates \$300,000. The value of their stock as breeders is now in such demand, that possibly \$2,000,000 could be obtained for it.

Most of the early attempts to rear foxes failed because:

1. No good fencing material, such as the woven wire used at the present time, was available.
2. The monogamous nature of foxes was not recognized and being quartered in one pen in large numbers, the young were killed.
3. The price of fur was not high enough to induce breeders to risk large amounts of capital in experiments, and those who had the aptitude for the business usually possessed but little capital.

The rising prices for silver fox in the 'nineties', the availability of woven-wire fencing and the persistence of men like Oulton, Dalton, Beetz and Burrowman are responsible for the successful methods of ranching evolved. The fox-breeding methods of the pioneer breeders were kept from the public, and as late as 1910, not more than a dozen ranches were in existence. The last big sales of fur were made in that year, and selling for foundation breeding stock has been general since that time. So great is the demand that the prices of breeders have risen in two years, from \$3,000 a pair to \$15,000, and at the date of writing—December, 1912—the best stock cannot be obtained at the last-named figure.

III. Manual of Fur-Farming

COMMON RED FOX

THE fox is found on every continent and comprises a number of species. The common red fox, which exists in the greatest numbers, has a range which "extends across Europe and northern and central Asia to Japan, while, to the south, it embraces northern Africa and Arabia, Persia, Baluchistan and the northwestern districts of India and the Himalayas." In North America its range extends south to Virginia and includes all Canada (except some northern regions), and the northeasternmost portion of the United States. Its wide geographical range accounts for many distinct local phases or geographical varieties. These phases, or sub-species, differ from one another in form, in size and, to some extent, in colouring; but the differences are often not apparent to the untrained observer. It is easy to distinguish the four species of foxes commonly seen in America, viz., the common red with its white-tipped tail, the arctic or polar fox with its short ears and blue or white pelt, the kit-fox with its black tail and small size, and the gray fox with its gray and red colour and erectile hairs down the tail; but it is more difficult to distinguish the sub-species of the common red fox. These are classified as follows by Merriam:

COMMON RED FOX (*Vulpes*) which, in some districts, is found in several colours, viz.:

Red Fox—When red and white with dark points;

Silver Fox—No red, but dark all over with silver amphimaculated hairs intermixed; white on tip of tail;

Cross Fox—An intermediate form, similar to silver fox, but with red sides, neck and ears.

V. fulvus—Ontario, Quebec, Eastern United States.

V. bangsi—Labrador and North shore of Gulf of St. Lawrence.

V. deletrix—Newfoundland.

V. rubricosa—Nova Scotia, New Brunswick, Gaspé, Prince Edward Island.*

V. regalis—Manitoba, Dakota, Montana, Alberta.

V. macrouris—Wyoming, Nevada.

V. abietorum—British Columbia, Alberta, North West Territories.

V. alascensis—Alaska, Yukon.

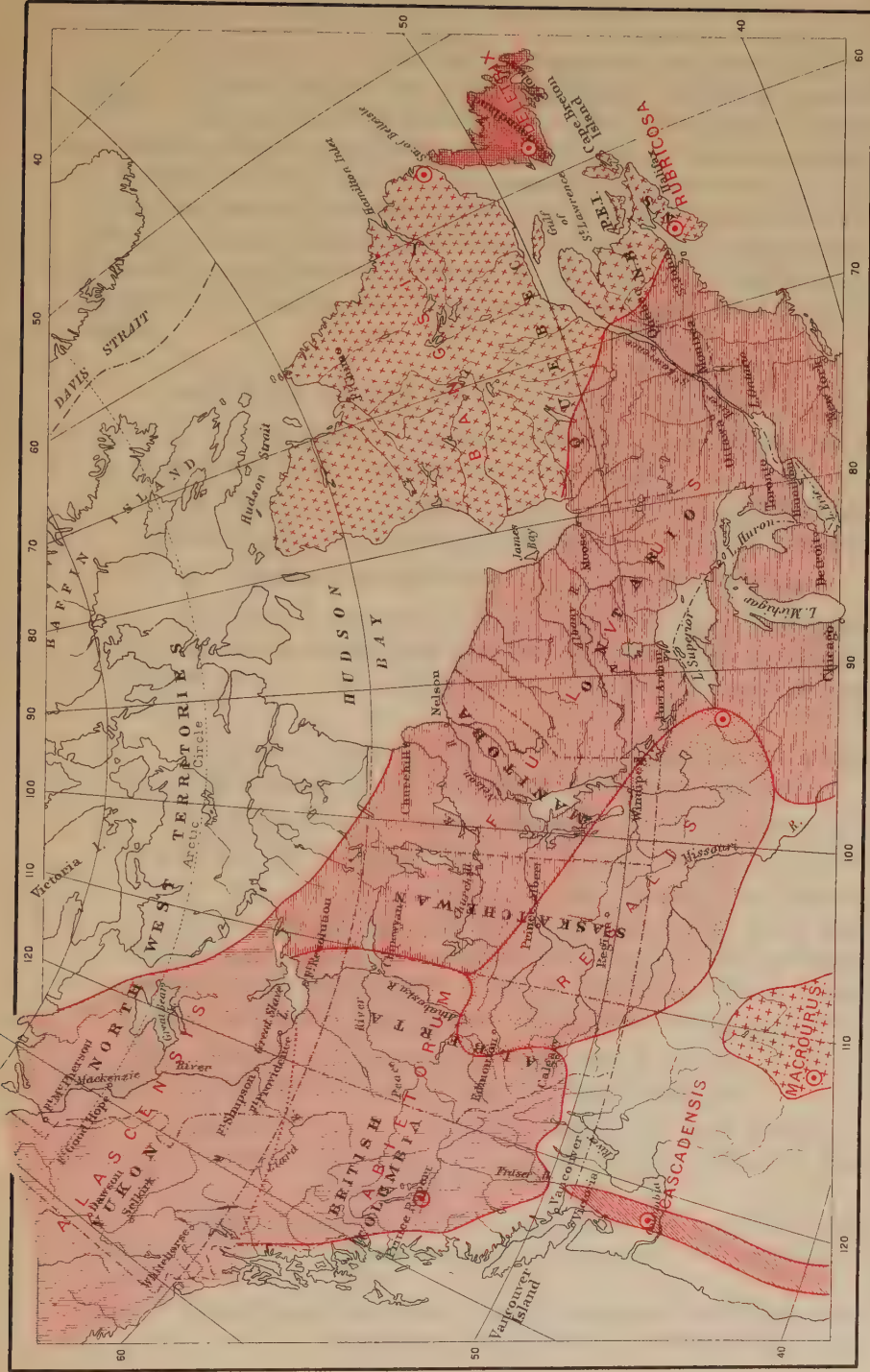
V. harrimani—Kadiak islands.

V. kenaiensis—Kenai peninsula.

V. cascadiensis—Washington, Oregon, California.

V. meador—California.

* As it has been segregated for ages, the Prince Edward Island fox is, possibly, a distinct variety.



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MAP 1.—RANGE OF THE NORTH AMERICAN RED FOXES IN CANADA

This map is diagrammatic and must be greatly modified by further work, especially in the west. It is founded chiefly on C. Hart Merriam's revision with additional records by E. W. Nelson, S. F. Baird, J. Fannin, R. MacFarlane, Audubon and Bachman, A. P. Low, V. Bailey, E. A. Preble, O. Bangs, A. E. Verrill.

The following are the species:

Vulpes fulvus (Desmarest),
Vulpes macroturus Baird,
Vulpes cascadenensis Merriam,

Vulpes rubricosa Bangs, with 2 races,
Vulpes deleteria Bangs,
Vulpes alascanensis Merriam, with 2 races,

Vulpes lenaensis Merriam,
Vulpes korringhami Merriam,
Vulpes regalis Merriam.

**Colour
Phases**

Investigation of the debated question of the colour phases of foxes has produced definite information regarding its occurrence. The fact that the cross, silver, black and red colours are all colour phases of the common red fox is of too common knowledge to warrant the citing of the many cases examined for evidence. The colours all exist and why they exist may be left to the discussion of biologists, some of whom say that ages ago foxes were originally dark coloured and that the silver is atavistic. It will be more useful in this discussion to describe how the darker colour is produced from red parents.

A summary of the facts may be given as follows:

1. Silver parents always produce silver pups—never red or cross pups. (See possible exception below.)
2. Red parents mostly produce red, but, occasionally, some cross pups and even a small proportion of silver pups is produced.
3. Usually cross (patched) parents produce cross pups.
4. When a silver and a pure red are bred, they produce red pups with blacker markings on the belly, neck and points than the red parent. The pups are about of the colour known as 'bastard.'
5. When a bastard red fox and a silver are mated the litter is on the average 50 per cent silver and 50 per cent red.
6. Bastard red parents often produce a black or silver pup in a litter—the proportion of silver being about one out of four.
7. The exceptions to the above rules are that sometimes the colours do not segregate, but rather blend, as in roan cattle when red and white hairs are intermixed and not separated into distinct patches. Cross foxes are produced by mating a red and a silver and, sometimes, an intermediate colour is secured in the pups.

Thus, in some districts, every combination of the red, white and black colours of foxes is found. There are foxes which are:

RED	<div> <div><i>Red.</i>—Red above and white below, with dark points.</div> <div><i>Bastard.</i>—Red above and dark below and on the neck, with darker points.</div> </div>
CROSS or Patch	<div> <div><i>Poor Cross.</i>—Mostly red and dark as above with a silver patch down the back and over the shoulders and hips.</div> <div><i>Good Cross.</i>—Red on the sides, neck and ears, dark below and silvery over the back, shoulders and rump.</div> </div>

Silver	{	<i>Silver or Light Silver.</i> —Silvery all over, except the neck; dark below and white only on the tip of the tail.
		<i>Silver Black or Dark Silver.</i> —Black all over, except the tip of the tail and the silvery hairs on the hips and forehead.
		<i>Black.</i> —Pure black all over, except the tip of the tail, with, perhaps, dark silvery hairs only discernible on close examination.

No two foxes are exactly alike in colour. Three silver foxes examined had no white tips on their tails and others had only a half dozen white hairs—yet the white tip is one of the marks of identification for the species. Others had white patches on the legs or breast, while the rest of the colouring was almost pure black.

A silver fox usually produces silver pups when mated with a pure red in two crosses. If the first cross produces all red pups, two plans may be adopted:

(a) A male and a female pup may be crossbred, producing, on the average, one silver pup to three reds.

(b) A red pup may be bred to the silver parent, producing, on the average, 50 per cent. red pups.

It is a more unusual occurrence to secure a blend or intermediate colour from crossing a silver and a red. By breeding the pups for four generations to a silver, the red colour is eliminated from the pelage markings. The segregation of the red and silver colour appears to be very common in many localities, but, in others, the roan or intermediate form of colour is produced quite frequently, the parent characters blending and the hybrid breeding true.

In this connection it will be of interest to quote from a letter dated August 2, 1912, received from Professor W. Bateson of Cambridge University, England, a naturalist of high repute and an authority on hair pigmentation. In the early stages of the investigation the usual opinion of naturalists and breeders was accepted and it was thus stated to Professor Bateson that silver parent foxes would produce an occasional red pup. This popular opinion has since been found to be usually incorrect. Professor Bateson's opinion has, therefore, been proved correct in every detail by subsequent development,

Professor Bateson says:

“At first sight I should suppose silver to be a recessive to red and that it would always breed true. This, however, you say, is not the case. If silvers, really, when mated together, throw reds, there must be some complication which we cannot yet represent.

Provisionally, I should doubt the statement until incontrovertible evidence is produced.

"I am not perfectly clear what a silver is, but I take it that a silver fox is to a red fox what a silver tabby is to a common tabby, viz., the same thing devoid of the red or yellow element. It may be difficult to disentangle the relations of the colour when there is a series of gradational forms* and, in the first instance, I should try to get a family in which the distinction between the reds and the silvers was sharp. Then I should breed the silvers together—brother and sister if need be.

"From what you say, I infer that two silvers of opposite sexes cannot be gotten to start from. That being so, you must mate together the silvers produced which you will raise from the reds produced by mating red and silver—if only reds come. But, if silvers come, then mate them together or back with the silver parent.

"Apart from the great practical difficulties which there are in breeding foxes in domestication, I think you will easily fix a strain of silvers."

Professor Bateson outlined perfectly the fox-breeding experiences of ranchers. Those who have spent their time working with gradational forms like the cross or patched foxes do not know what they will get until mating tests are made. Those who have chosen two distinct colour types are able to breed out to the pure recessive type in two generations.

**Characters That
Do Not Blend**

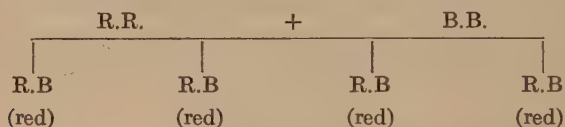
Dr. Eugene Davenport makes an explanation of the action of Mendel's Law of Hybrids that will prove instructive to many breeders. He says:

"When diverse characters are thus brought together two very different results may follow. They may blend into a single new character, in which case our figures show the *proportions within the blood*, or they may remain distinct as two independent characters within the same individual. Stature and size as well as many colours blend freely, but not all characters behave in that simple way. For example, white and black blend freely in the human race, and the offspring of white and negro are mulattoes of various shades, according to the respective infusions; but colours do not blend in pigs, which are either black, white, or spotted, never roan or mulatto. Some colours blend in horses (roan); some do not. Some breeds of cattle have blended colours (Shorthorns); in others, the colours remain distinct (Holstein-Friesian).

* Such as cross foxes.

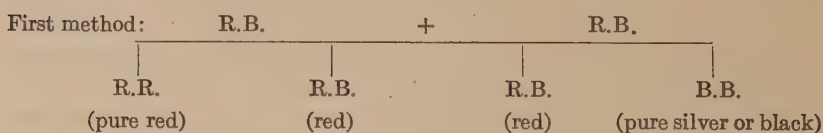
"And so with characters generally. Many will blend and many others will not. When they will not blend, then the appearance is still less a guide to the real hereditary qualities, and under these circumstances it is little or no index to what will happen when the mixture is bred. This fact was long a great stumbling-block to breeders, involving the business of improvement in unfortunate and as we now know, unnecessary mystery."

Silver Colour Mendelian Recessive to Red Suppose that a breeder has a silver fox, which, being recessive, always breeds true, and he chooses a pure type of red fox for a mate, being careful in order to secure pureness of type to obtain the red fox from a district where no melanism exists. Let the red fox be denoted by R.R. and the black or silver fox by B. B. (As to results, the sexes are equal in influence.)

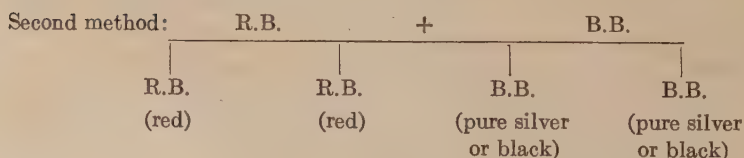


All pups are red, but of the bastard type mentioned above, with blacker points,—legs, muzzles and ears. They are really half black, but the colour is hidden or recessive in the first generation, red being dominant.

There are now two methods by which he can proceed to secure the black colour or pure B.B.



Results: One-quarter of the litter is pure red
 One-half of the litter is red of the bastard type
 One-quarter of the litter is black or silver



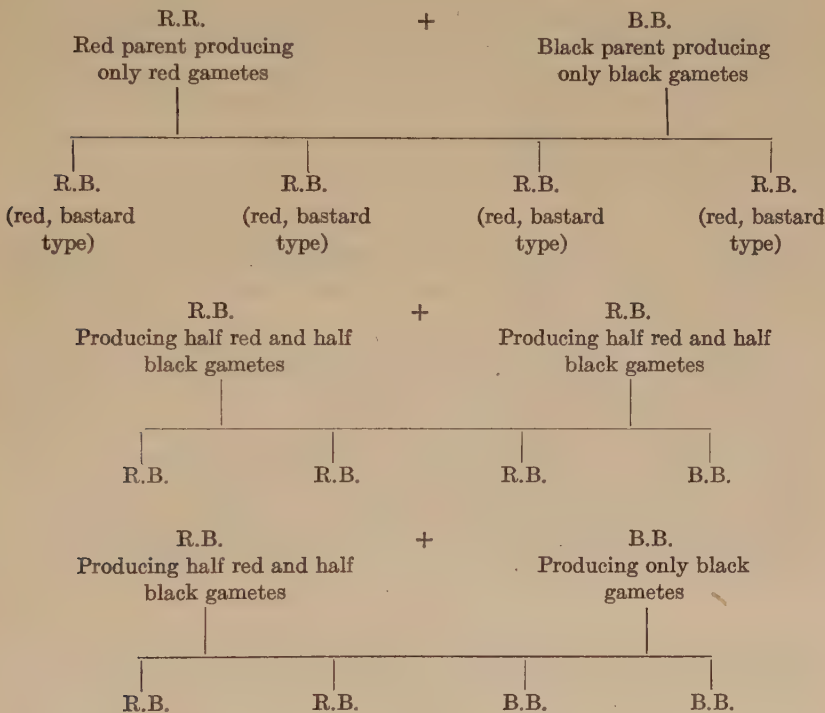
Results: One-half of the litter is red of the bastard type
 One-half of the litter is pure black or silver



1. A RED FOX TWO MONTHS OLD—SHOWING A DARK LINE OF BLOOD
2. A CROSS FOX, RED ON SIDES, NECK AND EARS—SEPTEMBER FUR
3. A DARK SILVER FOX WITH A WHITE PATCH ON HIS BREAST
4. A BLACK FEMALE IN OCTOBER

Thus, it may be concluded that, in a district where melanism occurs, or where black and cross foxes occur, or either, there are very few foxes bred pure as to colour.

If the unit of union be regarded as of gametes which are produced by each parent in the proportion of its ancestors—red and silver—the results may be forecasted by a simple mathematical calculation, the Law of Probabilities governing the mating of the gametes.



It will be noticed that when the black colour (B.B.) appears the animal is always pure, while R.R. is pure red and R.B. is also red with darker points.

It is well to bring out clearly the average results to be expected, as considerable speculation is indulged in as to whether or not certain foxes when bred to a silver will produce some silver pups. As much as \$500 each has been paid for red pups that have one silver parent, because it is expected that, if the pup is mated to a silver, the resulting litter will be composed of silver and red foxes in about equal numbers. The hopes are realized in most instances; but many chances of securing silver pups are lost because the breeder gets only red pups the first generation and becomes discouraged.

**Rearing Silver
Foxes from Reds**

There is a wide-spread belief that the silver descendants of red foxes are rusty black in colour and are not as pure a type as those bred pure for generations in the fox ranches. Professor W. E. Castle, of Harvard University, says that only experiments will prove what quality will be obtained in the silver young of a red parent.* The results noted in this investigation indicate that some of the best skins ever produced are those of silvers having a red parent. There was difficulty in obtaining information on this important point as breeders were extremely reticent in giving information concerning their experiences in cross-breeding with reds, because of a great prejudice against such breeding on Prince Edward Island. The prejudice, no doubt, results from an ignorance of Mendelian principles in segregating types.

It is interesting to note that Rev. George Clark, of St. Catharines, Ont., has in his possession a black dog fox obtained from near York Factory, Hudson Bay, which, he asserts, has sired none but silver pups, when mated with any vixen. Of course, the five or six litters sired by one dog does not provide sufficient data from which to form a general conclusion. It may be that many of the thousand or more red foxes kept in captivity will yet be crossed so as to produce a proportion of silver stock. As the red foxes were generally purchased from districts which produce very ordinary pelts, it is quite probable that, in many cases, the resulting silver will not be of good quality. The climatic conditions of Canada, however, which are very favourable to the production of good pelts, may improve exotic sub-species.

**Cross Foxes
as Breeders**

Breeders are generally better pleased if cross foxes are produced the first generation; but, as a rule, if cross foxes are bred out, the tendency to produce an occasional red pup will never be wholly eliminated. Having cross foxes in the ancestry of silver foxes means that a proportion of red gametes are thrown and

* Professor Castle, replying to an inquiry, says:

"The several facts stated in your letter of November 14th, which I assume you have sufficiently verified, show clearly that black (or silver) coat character in foxes is a Mendelian recessive in relation to the common red coat and may be recovered in the second generation from a cross with red. Whether it would be improved or deteriorated as a consequence, experiment alone could show. I should think that the 'patch' or 'cross' foxes occasionally obtained in the F_1 generation might be well worth experimenting with, as indicating in that particular strain a tendency for the dominance to be reversed. If this tendency could be strengthened by judicious selection, a more potent strain of silvers might result. If, by this means, a strain potent enough to dominate F_1 could be secured, it is evident that silver foxes could be produced much more readily."

at any time a red fox may appear among the other silvers in a litter. Few cases of red or cross pups among litters of silver pups were recorded, and no absolutely reliable evidence that any were found was submitted; but the general opinion seemed to favour the statement that an occasional red pup appeared. Any breeder of silvers who had such impure foxes in his pens would be likely to conceal the fact by killing or removing the red pups. Silver foxes can be produced of good silver colour by top-crossing cross foxes with silver for several generations and, if the silver foxes used in the crossing had ancestors of cross foxes, the probability is that a proportion of red, bastard, and cross foxes would appear among their offspring. All evidence tends to show, however, that very few, if any, with red colour on them are produced, and it is clearly demonstrated that the blackness of foxes can be made practically permanent by top-crossing to silvers. After mixing up red, cross and silver foxes for several generations, it is practically impossible to estimate the kind of pups that will come. Litters were seen that had red pups, cross pups and silver pups in them.

**The Best
Furred Foxes**

Beyond a doubt, the finest foxes in captivity are the descendants of foxes captured in Prince Edward Island.

The best foxes, therefore, belong to the geographical species, *vulpes rubricosa*; or, what is affirmed—and is not impossible—the Prince Edward Island fox, because it has been cut off from the mainland, is a distinct sub-species or geographical race. No cranial and other measurements have yet been secured. If scientists admit the fact of its difference from the mainland species, a new name, *vulpes abegweit*, could be chosen—Abegweit being the Micmac Indian name for Prince Edward Island.

As London sales show that silver and red foxes from Prince Edward Island have been sold for the highest prices, the evidence seems to bear out the assumption of its superiority. Red foxes have, in some cases, sold for 80 shillings. Twenty-three red fox skins from Prince Edward Island, marketed in London in 1910, by one man, were sold for £68 sterling, or an average of \$14.39 each. Other vendors claimed to have received as much as 88 shillings each, but no documentary proof was produced.

When black colour phases of such animals are captured, they are usually of excellent quality in fineness and colour of coat. The ancestors of the highest priced foxes were dug out of dens, as a general rule situated on Prince Edward Island.

One instance of the capturing of wild foxes may be quoted, as the silver blood procured on this occasion flows strong in the highest priced animals of the present time. Two residents of Bedeque, P.E.I., had

seen a red vixen in that locality, and it was reported one winter that a silver fox was seen running with her. The following July (1900), Louis Holland and Louis Spence found the den and proceeded to dig the young foxes out. They found four blacks and three reds, which they sold to Charles Dalton for \$300.

Many other instances show that litters frequently occur in nature as described above—half of the litter silver and half of it red. One red female ranched in Nova Scotia and mated to a silver fox has produced fourteen pups in the years 1910, 1911 and 1912. Seven of the pups are red and seven silver.

Most of the fox-breeders in other provinces have sold silver and dark silver stock to Prince Edward Island, where the demand has been greatest. Probably in all the dozen or more ranches in Ontario there are not two score silver foxes. The stock kept are bastard and cross foxes that produce litters with a proportion of silver pups. As their experience in selling fur has not led them to believe the present high prices for breeders in the Maritime Provinces are warranted by the pelt value of the animals, the attitude of Ontario ranchers has, in general, been to sell out at the high prices offered.

Because of continued importations of foreign stock into Prince Edward Island, probably thirty or forty per cent. of the silver foxes have been crossed with outside stock. In the majority of cases, the fur value has been lessened though, possibly, the crosses in some cases result in an improvement in size, fecundity, or other valuable quality.

The appearance of many of the imported foxes examined would seem to warrant the conclusion that they are usually of a much lower fur value, especially those from Newfoundland (sub-species *V. deletrix*), whose pelts almost uniformly have a rusty-black appearance and are coarse and 'flaky.' The Quebec and Labrador foxes (sub-species *V. bangsi*) are much superior to those from Newfoundland. The Ontario foxes (sub-species *V. fulvus*) are secured from so many distant points that it is impossible to make a positive statement respecting their quality. Some of them appear to be first class and will prove to be excellent foundation stock for selective breeding for fur.

Fur experts who have given special study to the fauna of Canada say that the red and silver foxes found on the Athabaska river and in the Yukon and Alaska are often of great value. These regions should produce a weighty pelt and, if good quality were secured in foundation stock, conditions for fox ranching should be ideal—especially if venison and fish could be easily secured for food.



A MATED PAIR, VERY DARK SILVER MALE AND HALF SILVER FEMALE; OCTOBER FUR



PEN IN THE MAPLE WOODS—SUNNY IN WINTER AND SHADED IN SUMMER

RANCHING PRACTICE

While it is legal to keep fur-bearers in captivity in those provinces in Canada where there is no close season provided for them, it is unlawful in most provinces to keep protected fur-bearers during the close season. It is also unlawful to catch fur-bearers for ranching purposes in the close season in all provinces except Prince Edward Island. Apparently it is lawful in Saskatchewan and Quebec to hold the animals during the close season, provided they have been caught in the open season, or brought from a point outside the province. In all the other provinces, no ranching can be legally done without a permit from the provincial department charged with the care of game and fur-bearing animals.

The various provincial authorities can encourage fur-farming by amending their game laws so as to allow the issue of permits to residents to catch fur-bearers and hold them in captivity for breeding purposes at any season. Requiring annual returns of production would prevent any abuse of this privilege.

**Location of
the Ranch**

If foundation stock of excellent quality has been secured, the next most important question to be considered is the selection of a site for the ranch where the quality of the stock can be maintained from generation to generation. Climatic influences are largely responsible for the value of the coat of fur. If an abundance of good food can be secured, an animal produces the heaviest coat where the climate is coldest. Humidity of atmosphere must also be considered. Poland says that open water, such as lakes and seas, renders the fur thicker, probably owing to the high percentage of humidity in the atmosphere. Exposed sea coasts and exposed prairies, he says, render fur coarse, while woods and forests cause it to be finer. For instance the timber or forest wolves have finer fur than those living on the exposed prairie. Mr. Wesley Frost, United States consul at Charlottetown, in a report to his government in 1912, says: "The temperature and humidity on the island (Prince Edward) are a happy mean between the intense cold and the moist, dull weather of Newfoundland, Labrador and Alaska, and the warmer, drier weather of regions farther south. The far northern furs are said to be coarse and shaggy, while the furs produced in the northern states of our own country are light and thin." It is also said that the absence of limestone in Prince Edward Island and Westmorland county, New Brunswick, gives a perfect soil for foxes to burrow in and is beneficial to the fur covering. As some excellent foxes never burrow at all, the ranchers carefully stopping up the holes whenever a start is made, there cannot be much ground for this assumption.

The following is a summary of the best conditions for fox-ranching operations:

1. Foxes should be ranched in woodland areas in a climate cold enough to produce a heavy fur and overhair.

2. The value of the pelt depends on good health as well as on climatic conditions. Wholesome varied food is a necessary condition for health and can be best secured in a thickly-settled rural district.

3. Foundation stock should be the best obtainable. The best foxes are those in captivity in ranches, and they have the additional advantage of being half-domesticated.

There are some advantages to be gained by conducting extensive ranching operations in one locality, particularly because breeding animals may be easily exchanged and the dangers of close, or in-breeding, prevented. Neighbours can also impart to one another more freely what their experience has taught them. These advantages, however, may be offset by the difficulties of securing food for the foxes. In every rural township there is enough cheap meat and offal to supply flesh diet to scores of foxes, but not to hundreds. Several hundred foxes, therefore, in one neighbourhood, would necessitate the purchase of costly meat. An ordinary farm has enough waste meat scrap, dripping, bread, biscuits and game to support several animals.

A Woodland Site

A wooded area, not subject to flooding, and where the snow does not pile up in deep drifts in winter, is best adapted for the site of the ranch. The subsoil should be a hardpan to prevent deep burrowing and escape under the fences. Areas which produce a growth of birch, spruce, fir and cedar, with heath plants and blueberries in the open areas, have usually a good turfy cover and a hardpan subsoil near the surface. In such a situation it is easy to erect pens as the fences have only to be extended down to hardpan to prevent the foxes from burrowing under and escaping. A sandy soil and subsoil, on the other hand, entails an additional expense, as they can burrow to depths of six feet or more. A family of foxes working one behind the other will relay earth out of a sandy hole in a veritable shower. In ordinary loam, the fence is not considered safe unless it extends down a depth of over three feet and is founded on a subsoil of considerable hardness.

Proximity to the dwelling of the keeper is also an important consideration. This is usually accomplished by building the ranch in a woodland lot a few hundred yards distant from the house, or, if the ranch is a considerable distance from the owner's dwelling, by building



THE BEST LOCATION FOR A RANCH IS IN A WOODLOT

a house for the keeper. It is not advisable to keep fox pens nearer than twenty rods to a dwelling as, particularly at certain seasons, the peculiar and somewhat disagreeable 'foxy' smell is strong and unpleasant.

The advantages of a large woodland ranch may be summed up as follows:

1. The outer fence and bush cover protect the foxes from curious sightseers, dogs, cattle and thieves, and gives them a sense of being hidden from enemies.

2. The bush cover is especially valuable for nervous foxes to hide in and to provide shade for the fur. They will also sleep contentedly all day under a bush, where it is more healthful than in a nest or a burrow.

3. The outer fence is an additional insurance against escape to the woods. If a fox escapes from the paddock, he can be easily caught in the outer enclosure, or, if the door is left open, he may, of his own accord, go back to his pen at feeding time.

4. The snow does not pile in drifts, but lies level, on wooded areas. Huge drifts necessitate higher fences, or wiring over, to prevent escape. Fences do not need to be more than six or seven feet high if the snow never lies more than one or two feet deep.

5. A ranch in the woods has more equable climatic conditions. It is cooler in summer, less windy in winter, and is warmer for young foxes in the spring. There is less thawing and freezing up of snow to injure the fur. It also affords protection from rain and sleet.

6. The foxes can hide from thieves and could not be captured by a stranger unless the house were broken into when they were shut in their nest. So much noise, however, would be sure to rouse the dog and the watchman.

7. The outer enclosure permits of protective measures being taken. The keeper sleeps in a house there. Dogs are kept chained. Traps for thieves are laid, as, *e.g.*, bear traps, burglar alarms, electric shocking devices; and some ranches are lighted with lanterns or electric lights and equipped with telephones.

8. Large ranches seem to be more successful than smaller ones, because foxes in contiguous pens are company for each other.

**Other Sites
Chosen**

If a wood lot is not available, the ranch may be built in cleared ground and quick growing trees planted.

The Carolina poplar, soft maple, Manitoba maple (*A. negundo*), black locust and willow are among the fastest growers. One rancher living in an Ontario city in a grape-growing district has planted

grapes about the paddocks and will train them over his pens. The predilection of the fox for grapes is well known since the time of Æsop, but life in a vineyard may not be more beneficial to reynard's health than life elsewhere. The grapes provide a dense shade in summer, no shelter in winter, fresh fruit in season, and exercise in securing food. The whole ranch is surrounded by a concrete wall. Such a ranch is impossible in a district where there is a heavier snowfall, the lack of ventilation through the pens is objectionable and the cost is considerable. It shows, however, what can be done by an experienced breeder to establish an industry on city lots in a populous neighbourhood.

Sometimes an orchard serves as a suitable situation for a ranch. T. L. Burrowman, of Wyoming, Ont., for instance, has placed his pens in a four-acre orchard, the foxes being kept out of the trees by trunk shields.

Barnyards, open fields about the houses, hill-tops where snow drifts off and many other situations are frequently chosen, but the ranchmen, as a rule, regard such sites as temporary only. They usually contemplate larger ranching operations on better sites when sufficient capital can be raised.

**An Island
as a Site** Sometimes a small island has been chosen as a site for a ranch. When such is the case, visitors can be kept out of the vicinity more easily. Also a fox that has escaped is not apt to swim to the mainland away from the place where he has been fed. Prince Edward Island has an advantage over mainland areas as a ranching centre because a fox that has escaped can usually be traced and captured, whereas on the mainland, he could roam for hundreds of miles and get into uninhabited territory.

**Fences and
Fencing** When the site of the ranch is chosen, the bush surrounding the selected area is cleared for a width of four feet and the ground levelled for the erection of an exterior fence. The trees are trimmed or cut so that foxes may not climb over the fence by means of them. Post-holes about three feet deep are dug from 10 to 16 feet apart, cedar posts being used if it is possible to secure them. If cedar, locust or other durable wood cannot be obtained, the ground end of the post may be charred or treated with hot petroleum or creosote to render it more lasting. Posts from 10 to 15 feet long are used according to the usual snowfall of the locality and should be sharpened at the end to prevent heaving by the frost. A post four inches in diameter at the small end and 12 feet long will cost from 30 cents in some districts, up to 75 cents in others.



DETAIL OF FENCE CONSTRUCTION WITH SHEET IRON



DETAIL OF FENCE CONSTRUCTION. MANY BREEDERS PREFER AN ALLEY
SURROUNDING EACH PEN

The corner posts need not be anchored when a purline is used. The latter is made of one-inch boards, four inches wide, or of straight poles. These are nailed to the posts to brace them and support the meshed wire on the upper side. They also support the overhang wire.

The overhang wire is usually from 18 to 24 inches wide and is laid on brackets nailed at right angles to the posts and purline and then stapled to them. It is usually made of No. 16 galvanized wire having a two-inch mesh.

The fence is composed of two-inch diamond meshed wire fastened to the purline with staples and hung on the outside of the post. If several rolls of wire are used, the selvages are laced with a soft No. 16 wire. No. 16 galvanized wire is strong enough for the upper part of the fence and No. 14 to No. 15 galvanized for the lower. The wire is stretched at each corner with second class levers passed through the meshes, the post being used as a fulcrum. All corner posts must be perpendicular and care must be taken when the whole area is not perfectly level to pleat the wire or gore it when a change from one level to another is made; otherwise it 'buckles.' This occurs at corner posts on sloping land, and at changes of slope in the fence.

The exterior fence is frequently built of boards 6 feet or even 10 feet high. The upper four feet are usually of wire with an overhang to prevent the foxes from escaping. On the ground, inside, is a carpet wire three feet wide, made of No. 15 wire having a two-inch mesh. It is laid on the ground and laced to the selvedge of the fence at the ground level, or stapled, if the fence is of boards. The other selvedge of the carpet wire is stapled to stakes driven in the ground. As he almost always begins to burrow close to the fence, the carpet wire will prevent the fox from burrowing under it.

**Wire
Used** The most durable wire yet used has been imported from Great Britain. It is specially woven with an extra twist—and has a selvedge of three wires. In the smaller sizes a triple turn is made. The galvanizing, which is done after weaving, practically solders the joints. It comes in bales of 150 feet length and is of various widths. The best wire will last only from eight to twelve years underground. It is of interest to note that the aggregate sales of one of the largest hardware firms supplying this wire in Prince Edward Island have amounted to over 250 miles of wire, of an average width of four feet.

The following table shows the comparative cost of the various meshed wires manufactured. The Canadian price can be determined by discounting the list price for all sizes under gauge No. 14 by about 15 per cent. On account of a lower rate of duty, the list price of gauge No. 14 and larger gauges may be discounted by about 22 per cent.

DETAILED PRICE LIST OF RANCH WIRE

(Gross prices per roll of 50 yards; galvanized after manufacture).

Mesh	Gauge	12 inches wide	18 inches wide	24 inches wide	30 inches wide	36 inches wide	42 inches wide	48 inches wide	60 inches wide	72 inches wide	108 inches wide	Gauge	Mesh	
$\frac{1}{2}$ inch	22	3.53	5.10	6.61	8.07	9.67	11.30	12.90	16.15	19.35	22	$\frac{1}{2}$ inch	Made up to 96 inches wide
"	20	4.29	6.15	8.00	9.75	11.70	13.65	15.80	19.50	23.30	.....	20	"
$\frac{5}{8}$ inch	19	5.73	8.18	10.65	12.96	15.60	18.20	20.80	25.95	31.20	.....	19	"
"	22	2.85	3.84	4.99	6.09	7.20	8.40	9.60	12.00	15.40	22	$\frac{5}{8}$ inch	Made up to 96 inches wide
"	20	3.33	4.77	6.17	7.54	9.05	10.55	12.06	15.10	18.10	.....	20	"
$\frac{3}{4}$ inch	19	4.61	6.52	8.49	10.35	12.40	14.50	16.55	20.70	24.80	.....	19	"
"	20	2.26	3.21	4.11	5.00	5.84	6.82	7.80	9.74	11.68	20	$\frac{3}{4}$ inch	Made up to 96 inches wide
"	19	2.87	4.15	5.23	6.40	7.48	8.74	10.00	12.50	15.00	.....	19	"
"	18	3.92	5.62	7.16	8.73	10.20	11.90	13.60	17.00	20.40	.....	18	"
1 inch	20	1.81	2.58	3.27	4.00	4.66	5.44	6.21	7.76	9.32	20	1 inch	Made up to 84 inches wide
"	19	2.15	3.09	3.92	4.78	5.60	6.53	7.46	9.32	11.20	.....	19	"
"	18	2.62	3.76	4.77	5.82	6.82	7.95	9.10	11.36	13.62	.....	18	"
"	17	3.52	5.03	6.38	7.80	9.12	10.65	12.15	15.20	18.25	17	"	Made up to 120 inches wide
"	16	4.70	6.74	8.56	10.32	12.33	14.27	15.90	20.37	24.45	.....	16	"
$1\frac{1}{4}$ inch	19	1.73	2.48	3.15	3.79	4.40	5.12	5.85	7.32	8.78	13.15	19	$1\frac{1}{4}$ inch	
"	18	2.11	3.03	3.84	4.64	5.36	6.25	7.15	8.95	10.63	16.10	18	"	Made up to 120 inches wide
"	17	2.76	3.98	5.04	6.08	7.05	8.25	9.42	11.80	14.15	21.20	17	"	
"	16	3.72	5.34	6.80	8.22	9.50	11.10	12.68	15.85	19.10	28.50	16	"	
$1\frac{1}{2}$ inch	19	1.36	1.97	2.50	3.00	3.45	4.05	4.63	5.80	6.95	10.40	19	$1\frac{1}{2}$ inch	Made up to 120 inches wide
"	18	1.73	2.48	3.15	3.80	4.40	5.12	5.85	7.32	8.80	13.15	18	"	
"	17	2.26	3.23	4.11	4.93	5.73	6.70	7.60	9.55	11.45	17.20	17	"	
"	16	2.87	4.13	5.20	6.30	6.40	7.45	8.50	10.65	12.80	19.20	16	"	Made up to 120 inches wide
$1\frac{3}{8}$ inch	19	1.26	1.81	2.27	2.78	3.20	3.75	4.27	5.35	6.42	9.60	19	$1\frac{3}{8}$ inch	
"	18	1.55	2.22	2.80	3.40	3.95	4.60	5.20	6.55	7.90	11.80	18	"	
"	17	2.11	2.87	3.65	4.40	5.11	5.96	6.83	8.52	10.22	15.33	17	"	Made up to 120 inches wide
"	16	2.32	3.61	4.60	5.53	6.39	7.46	8.52	10.64	12.77	19.16	16	"	

DETAILED PRICE LIST OF RANCH WIRE (cont'd)

(Gross prices per roll of 50 yards; galvanized after manufacture).

Mesh	Gauge	12 inches wide	18 inches wide	24 inches wide	30 inches wide	36 inches wide	42 inches wide	48 inches wide	60 inches wide	72 inches wide	108 inches wide	Gauge	Mesh
2 inch	19	1.08	1.55	1.97	2.35	2.68	3.12	2.57	4.46	5.35	8.00	19	2 inch
"	18	1.36	1.97	2.52	2.93	2.40	4.00	4.55	5.68	6.80	10.20	18	"
"	17	1.77	2.54	3.25	3.84	4.38	5.12	5.84	7.30	8.76	13.10	17	"
"	16	2.30	3.29	4.20	5.00	5.72	6.67	7.62	9.53	10.63	17.15	16	"
"	15	2.89	4.15	5.26	6.28	7.38	8.37	9.57	11.77	14.34	21.54	15	"
"	14	3.72	5.31	6.80	8.10	9.25	10.82	12.36	15.45	18.54	....	14	"
2½ inch	19	.92	1.34	1.70	2.02	2.30	2.70	3.08	3.85	4.60	....	19	2½ inch
"	18	1.14	1.63	2.07	2.30	2.84	3.26	3.80	4.75	4.68	....	18	"
"	17	1.50	2.16	2.76	3.30	3.77	4.40	5.02	6.30	7.55	....	17	"
"	16	1.89	2.74	3.49	4.14	4.75	5.55	6.35	7.90	9.50	....	16	"
"	15	2.34	3.35	4.28	5.10	5.84	6.80	7.80	9.75	11.70	....	15	"
3 inch	19	.85	1.22	1.54	1.84	2.10	2.45	2.80	3.50	4.20	6.30	19	3 inch
"	18	1.00	1.43	1.80	2.17	2.47	2.92	3.30	4.12	4.95	7.40	18	"
"	17	1.38	1.85	2.36	2.82	3.20	3.70	4.25	5.35	6.40	9.60	17	"
"	16	1.69	2.32	2.94	3.50	4.00	4.68	5.35	6.68	8.00	12.05	16	"
"	15	....	2.74	3.49	4.15	4.75	5.55	6.35	7.90	9.50	14.20	15	"
"	14	....	3.33	4.22	5.05	5.76	6.70	7.65	9.58	11.50	17.25	14	"
"	13	.85	1.22	1.54	1.84	2.10	2.45	2.80	3.50	4.20	6.30	13	"
4 inch	18	1.34	1.43	1.81	2.17	2.47	2.88	3.29	4.12	4.95	7.42	18	4 inch
"	17	1.50	1.69	2.15	2.55	2.92	3.40	3.90	4.86	5.84	8.76	17	"
"	16	....	2.19	2.83	3.36	3.83	4.48	5.10	6.40	7.66	11.50	16	"
"	15	....	2.64	3.35	4.00	4.56	5.33	6.08	7.60	9.13	13.68	15	"
"	14	....	....	....	....	....	....	....	....	....	....	14	"

Made up to
120 inches
wide

Made up to
96 inches
wide

Made up to
120 inches
wide

The following list gives the prevailing prices of British-made diamond mesh ranch wire. They are from 10 to 20 per cent. lower than the prices of ranch wire of United States manufacture:

PRICE LIST OF RANCH WIRE

Width	Mesh	Gauge No.*	Price per 150 lineal feet
18	2	16	\$ 2.65
24	2	16	3.50
30	2	16	4.25
36	2	16	4.85
48	2	16	6.40
60	2	16	8.00
72	2	16	9.65
36	2	15	6.10
48	2	15	8.15
60	2	15	10.15
24	2	14	5.20
30	2	14	6.20
36	2	14	7.25
48	2	14	9.40
60	2	14	11.85
36	1	17	8.50
48	1	17	11.00
72	1	17	16.50
24	1	16	7.25
36	1	16	10.25

*See Appendix V.



USUAL TYPE OF KENNEL AND PEN



CHEAP KENNEL CONSTRUCTED FROM A PACKING BOX

**Construction
of Pens**

The requirements of an ideal pen may be summarized as follows:

1. It should be large enough for foxes to run in at full speed when playing.
2. Part of it should be shaded overhead and it should provide good hiding cover.
3. It should have warm, well-drained, sunny areas in which the young pups may play.
4. Turfy or mossy ground cover is desirable. Leaves, or spruce or pine needles, make a good ground cover. Sand is good, but mud is objectionable.

The smallest pens used by the best ranchers enclose an area of at least 900 square feet. One rancher has a highly-valued pair in an enclosure of over 4,000 square feet. The usual size is a pen enclosed by one bale of wire, which is 150 feet long. Thus the area is 37 feet by 37 feet, or 30 feet by 42 feet, or 25 feet by 50 feet. In some cases the last-named dimensions are adopted and cross fence used, so that the male is shut in one end and the female in the other during the latter part of the period of gestation and while the pups are young.

Inasmuch as they must be extended into the ground to prevent the foxes from burrowing under them, the paddock fences are harder to build than the exterior. When a solid hardpan exists, the fence may be laid on it, even if it is only one foot from the surface. If the subsoil is light and open, paddocks are not fox-proof unless the fence is buried over four feet. In light soil additional precaution may be taken by digging the trench wide and by rough-concreting the base a couple of feet inwards from the fence. One rancher, on a sandy area, planned to concrete the whole floor area of his paddocks and cover it with a foot of sand. When it interferes with the drainage, this use of concrete is objectionable.

The carpet wire should be used on the paddock fence as well as on the exterior. It prevents the fox from burrowing alongside the fence where digging out is always attempted.

The following material is necessary for the construction of a paddock fence 9 feet high and extending three feet into the ground.

- 12 posts, each 13 feet long.
- 150 lineal feet of 1-inch board, 4 inches wide.
- 150 lineal feet of overhang wire, 24 inches wide, 2-inch mesh, gauge No. 16.
- 150 lineal feet of fence wire, 5 feet wide, 2-inch mesh, gauge No. 16.

150 lineal feet of fence wire, 4 feet wide, 2-inch mesh, gauge No. 14.

150 lineal feet of ground wire, 3 feet wide, 2-inch mesh, gauge No. 14.

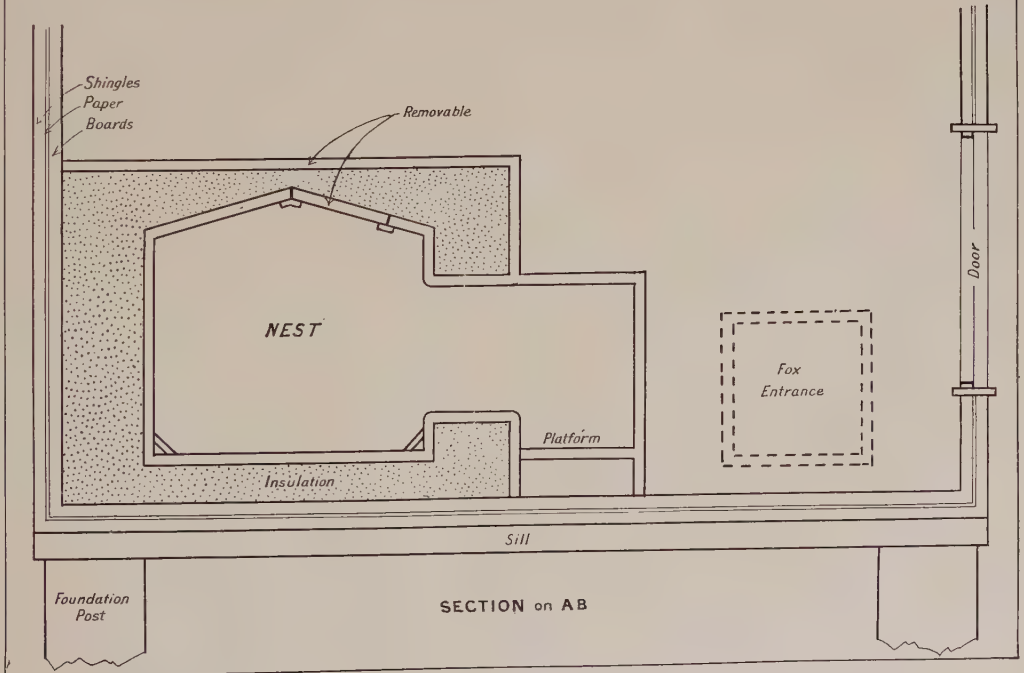
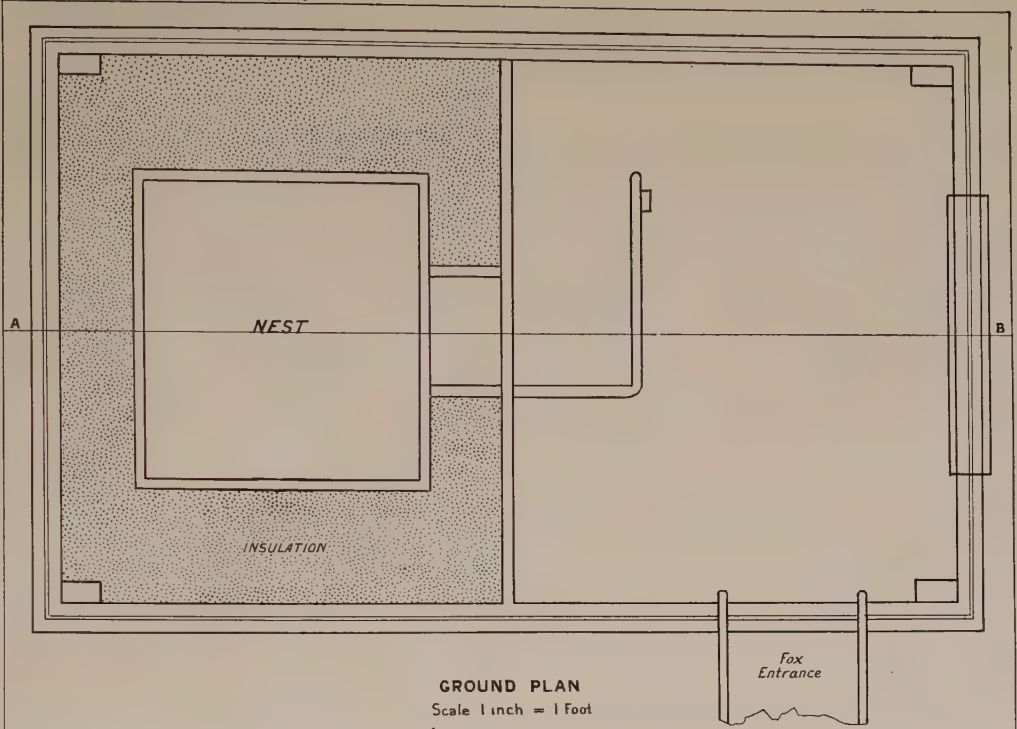
150 lineal feet of carpet wire, 3 feet wide, 2-inch mesh, gauge No. 15.

Nails, spikes, staples, hinges, locks for door and No. 16 lacing wire.

It is not customary to use a smaller meshed wire at the ground level, but cases are known of the death of fox pups caused by having their heads caught in the two-inch mesh. A smaller mesh, therefore, if it could be procured in No. 15 gauge, furnishes an additional precaution against the death of the valuable animals.

A new type of paddock fence, which is evidently an improvement, is being put up in some of the newest ranches. Instead of the two-inch mesh No. 16 wire, a strip of galvanized sheet iron three feet wide is fastened at a height of four or five feet from the ground. Joist pieces 2 inches by 4 inches are placed from post to post to nail to. The advantage of the sheet iron is that foxes cannot climb to the top of the fence and fall, breaking their legs or producing a rupture or an abortion. One pen was seen where the sheet iron was placed at the top of the posts and no overhang was required. Foxes climb fences only when badly frightened. Such a state of fear is to be avoided, but may be impossible to control with some animals. Sharp sticks and stumps near the fence should be taken out lest the falling fox be ruptured or otherwise hurt. The middle toe nails of the fox may be cut off every few months to prevent climbing, or the sheet iron used as described above. It should not be placed near the ground as it would interfere with the circulation of air in the paddock.

Paddock Door The door into the paddock should be placed from eighteen to twenty-four inches above the ground level and should be provided with good hinges and a good lock. If no exterior fence is used, make a double door entrance, so that one door is closed and locked before the other is opened. If foxes have the run of two pens, a door between the pens set up two feet high and with a sloping platform on each side from the sill to the ground, should be provided. Doors should be about 2 feet by 4 feet in dimensions. Many ranchers have a small passageway between pens, which foxes are obliged to crawl through, as when playing, they do this so often that they wear off the guard hair over the hips and shoulders.



FLOOR PLAN AND VERTICAL SECTION OF A FOX KENNEL

Construction of the Kennel In the earlier days, the houses were of logs, barrels, or boxes. Later, a small box was placed within a larger one and the intervening space packed with sawdust or chaff. An entrance was provided by a passageway constructed of boards. The roof was made water-tight by a piece of sheet iron. Such houses are still in use, but have the disadvantage of being easily robbed.

Mr. Burrowman and some other Ontario ranchers attempt to imitate nature more closely by constructing solid one piece cement dens built mostly underground and in well drained spots. They can be made quite thief-proof and, indeed, there is apparently no way for the keeper to get access to the nest. In the case of one den, at Bothwell, Ont., it was only possible to crawl in by shovelling out the small entrance used by the fox.

The most generally approved houses are wooden constructions, placed in the centre of each paddock. The interior consists of an inner and an outer kennel, and the entrance for the foxes is through a passageway of rectangular cross-section constructed with four boards. The interior dimensions of this passageway should be about $7\frac{1}{2}$ in. by 10 in., and it should slope from the building down to within 6 inches of the ground. The entrance for the keeper is through a door in the end, or else by means of a hinged roof. The door or hinged roof is, of course, always kept locked. The house is usually made with a floor area 3 feet by $4\frac{1}{2}$ feet, or slightly larger. The posts are about 3 feet high; the walls are boarded, papered and shingled; the floors are double boarded with paper between; the roof is boarded, papered and shingled and ventilation is proved by openings in both gables. All parts that the foxes rub against are smoothed and sand-papered so as not to injure the overhair. The building should be set on skids a foot off the ground so that the foxes cannot hide under it.

Construction of the nest The inner kennel or nest is to be the home of the young foxes and must be large enough to prevent crowding and small enough to be warmed by the body heat of the animals. The Usual size of the nest is about 18 in. long by 18 in. wide by 20 in. in height, but some prefer to make them with floor dimensions 16 in. by 20 in. The entrance, 8 inches in diameter, is centred on one side; the floor corners are filled up with a triangular piece of moulding; three or four half-inch holes are bored in the roof to provide a slight ventilation and the roof or cover of the nest can be lifted off so that the manager can see into the nest when necessary. The nest is kept warm by being packed about on all sides with some material of low thermal conductivity. The best yet discovered are the ground cork in which the Spanish Malaga grapes are packed, dry seaweed, sawdust, chaff

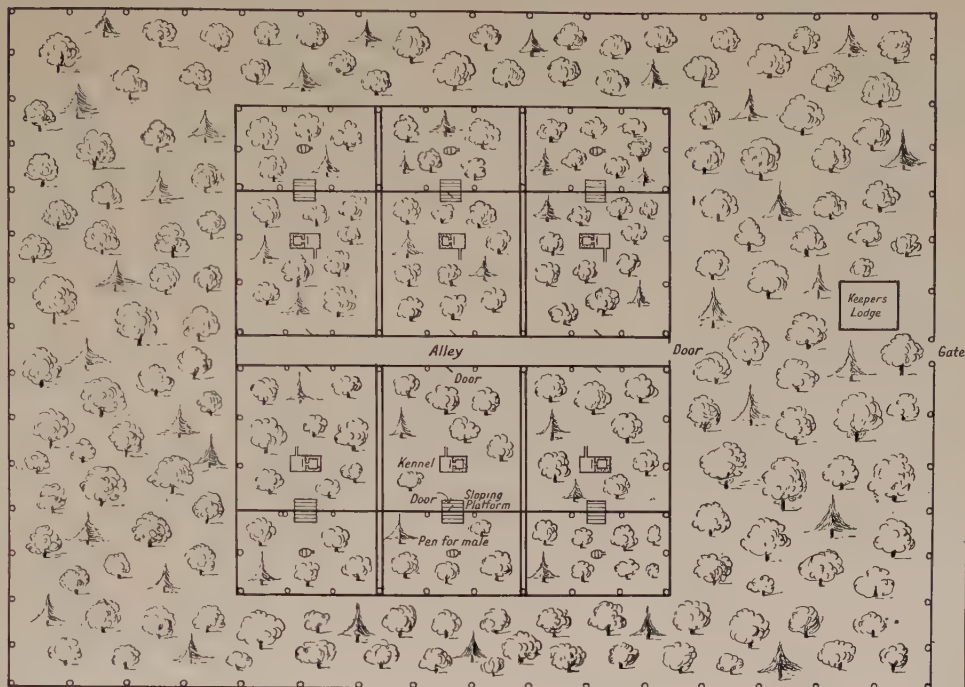
and leaves. A space of four or five inches all about the six sides of the box packed with insulating material will retain the heat sufficiently and will absorb dampness. In some cases, a light bedding of earth, leaves, seaweed or marshgrass is given in the winter.

Arrangement of Pens and Kennels It is usual to place pens side by side on both sides of an alley about six or eight feet wide,* the fences at the ends of the alley being an additional safeguard against escape. The dog (or male) pen, according to one plan, consists of one end of the common pen and the male is segregated by simply closing the door. According to another plan, the pen for the male is several feet distant and segregation is effected by simply closing the slide door in the passageway. The kennel provided for the dog fox may be a box or barrel with a chute entrance. The dog pen is becoming less used year by year. It should be constructed near the other pen and arrangements should be made so that the pairs can be separated quietly. No confusion or excitement whatever in effecting a separation of the male and female at this critical period should be permitted.

Food and Feeding The food of foxes in the wild state does not consist wholly of flesh as many suppose; for, to a certain extent, the fox is omnivorous, and will eat grass and berries. If flesh only were fed to a ranch fox the probability is that, after a time, digestion would be greatly impaired and the whole intestinal tract would become infested with worms.

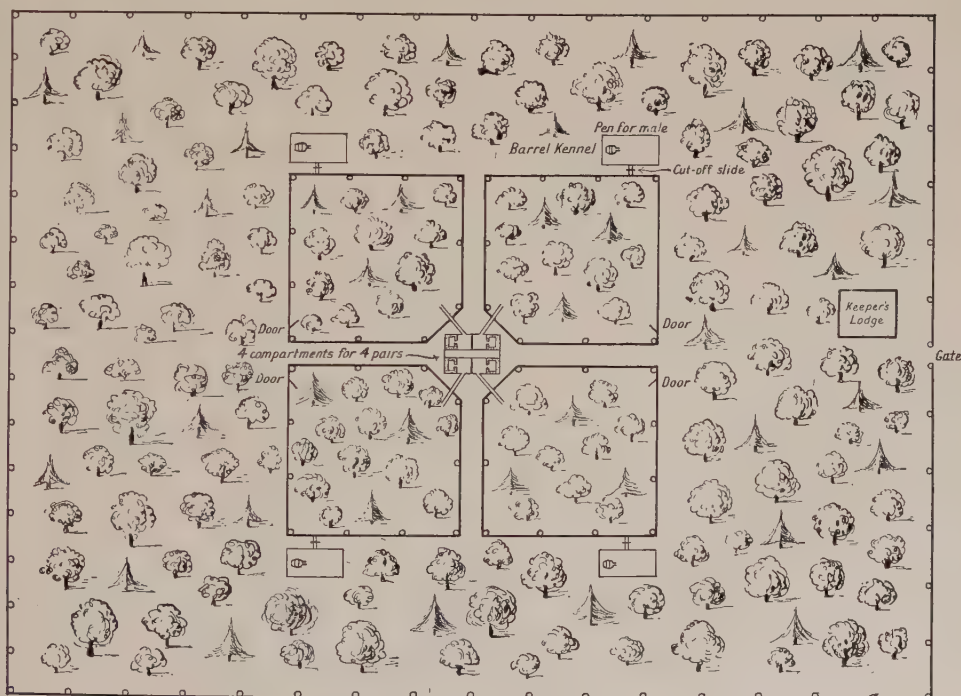
The food varies so much in each locality that it is impossible to do more than state the principles which should govern the feeding of foxes. The very fact that success is achieved with so many kinds of dieting proves that the fox, like the dog, can live well on almost any kind of food. A prospectus of a ranch at Copper River, Alaska, says that the pelts of their foxes have a magnificent sheen because the animals are fed on oily salmon. Ontario ranchers have many excuses to hunt rabbits and groundhogs, because they are 'natural' food for the foxes. J. Beetz of Piastre Baie, Que., finds fish and lobster good, and his success in catching foxes is largely due to the fact that they come down from the interior each winter to seek just such food on the shore of the St. Lawrence river. And who could tell an old Prince Edward Island rancher how to feed his foxes? 'The best in the house is none too good,' he says, and he will feed them almost everything he would

*See diagram facing this page.



THE BEST TYPE OF FOX RANCH

Scale 1 inch = 50 feet



A GOOD TYPE OF FOX RANCH

eat himself, and some grass, minnows, mice, crickets and berries besides.

Meat Diet The flesh diet of foxes is horse meat, calves, butcher scraps (livers, hearts, heads, etc.), fish (both cured and fresh), rabbits, groundhogs, mice, rats, birds, squirrels, lobster bodies and old cattle and sheep. The flesh is usually fed raw, but some feeders parboil it. It is salted slightly when parboiled, only a small amount of salt being used. Frequently carcasses are salted down in casks, and, when required for food, a portion is freshened by placing it in running water for a day or two. Some of the finest foxes seen were fed with this kind of food and seemed to be in very thrifty condition, possibly because of being free from worms. Some ranches have cold storage plants, and keep the meat packed with ice. No storage houses similar to bait-freezers are used as yet, but the bait-freezer at Rustico, P.E.I., might serve as a model for such a house. Neither has any mechanical réfrigeration of any kind been attempted.

Old cattle and horses are kept on the hoof and slaughtered from time to time as required. As foxes have been known to die of tuberculosis, these should be subjected to the tuberculin test or, at least, examined for tubercles after killing. The amount of meat fed should be about one-fourth pound a day and this amount should be decreased if any of it is buried by the fox.

Non-flesh Diet The non-flesh food consists of biscuits, yeast bread, hoe bread, vegetables, porridge, grass, berries, apples, milk and eggs. Patent dog biscuits are fed with good results, one ranch using only Spratt's biscuits, with milk and water, as food. The best ordinary biscuit is the plain hardtack. It is probable that hard-baked non-yeast bread is better than leavened bread. Bread is more relished if grease drippings are poured upon it. Tallow has been used with good success as a butter on hoe bread.

Any rations are liable to fail unless the food is served properly. The dishes should be frequently scalded and scrubbed and kept scrupulously clean. The water vessel should be fastened to the fence with wire hooks so that the foxes cannot climb over it. The food must be withheld when foxes are observed to bury or hide it. In frosty weather in April or May, frozen meat would kill the young foxes, so it is necessary to feed it warm or parboiled in such weather. If one fox dominates the other and takes too large a share of the food, a large quantity must be supplied at night and removed when both have had enough, *e.g.*, a cow's head may be left in a pen for several days to furnish the flesh diet.

Fox Biscuits A perfect fox diet can be secured in the patent dog biscuits. These are made with various kinds of food content, so that balanced rations can be provided. The biscuit medicines have also been proved excellent, and are easy to administer. It is possible that the manufacture of biscuit with meat or fish fibre will be an industry that will develop contemporaneously with fur-farming. The meat can probably be best preserved in this way and feeding made easier and pleasanter.

General Directions for Feeding Broken bone should not be fed lest some of it be swallowed. Bone should be fed, especially to young foxes, to assist in building up bone and in removing the milk teeth. Some do not feed bony fish, *e.g.*, perch, lest the bones rupture the delicate linings of the throat and intestines. Observation, however, leads to the belief that such injury is not likely to happen, as they are dainty feeders and, unlike dogs, do not devour their food greedily. In addition to bones, growing foxes are fed a quantity of limewater—about one teaspoonful a day—with their milk. This food gives a substance to the bone and insures stronger limbs. The pregnant mother should also be fed bone broth and limy foods to insure strong limbs for her offspring.

Neither of the foxes should be allowed to become too fat for breeding. When the foxes are less than a year old, they can be fed almost as much as they will eat; after they are older, a full diet may make them too fat for good breeding condition. An average size fox should weigh from eight to eleven pounds. Some feeders stint foxes in food in November and December and January, to get them into breeding condition; others endeavour to keep them normal always. In the mating season, foxes are very active, and fat pork is fed and a full supply of food is given to keep them in condition. Some roll the meat in sand and soil, claiming that soil is nature's medicine for worms. Some feeders throw food into the pen over the fence; others, in order to tame them, try to coax them to receive it from between the meshes of the wire. A skilful feeder can do more to tame his foxes through feeding them than in any other way. If the food is always delivered at the same place, the tendency will be for the animal to approach nearer and nearer at each feeding. The science of foods is of less importance than a knowledge of the art of feeding.

The mother should be well fed on an attractive and strengthening diet for several weeks before the young are born. Milk, eggs and bone broth are good for the purpose. When the young are expected, laxative

food should be given. When the mother appears after the young are born, she should be fed well several times a day with meat, eggs, fresh new milk, meat broth, well-cooked oatmeal and other appetizing and varied foods, while a supply of clean, wholesome water in a clean trough should be constantly available. Live rabbits and poultry, squirrel and other game may be used to give variety to the mother's ration.

Failure in Management

Despite the assertions of many experienced breeders that feeding is the most difficult of all operations in fox ranching, very little evidence was found to confirm this opinion. Few cases of failure due to bad dieting were noted. It is not difficult to keep foxes alive in captivity and, usually, the cause of nearly every loss can be traced. Occasionally mature foxes die suddenly and no satisfactory cause of death can be found, even though post-mortem examinations have been carefully performed by qualified operators. The proportion of deaths, however, is low, only four being reported in Prince Edward Island in 1912, though probably more took place.

In most cases, lack of success may be attributed to an inexperienced keeper. When men who have never fed even a horse or cow, attempt to rear foxes, they may keep them alive, and may rear a few young, but the probability of failure is great. The failures are usually made in feeding to maintain good breeding condition, and in the care and feeding at the critical period of whelping and rearing the young. The keeper's own character and disposition will have much to do with the success with shy and nervous foxes at this period. A good manager is always studying his animals at the breeding season and he carefully notes the dates of mating and whelping. He treats each pair according to their dispositions. In some cases he separates the male and female before whelping and, in other cases, he leaves them together. He must be observant, resourceful and faithful, for he is dealing with animals which have had only several generations of domestic breeding.

Mating and Gestation

The critical period of each year in breeding foxes is between the dates January 1 and June 30. At this time as the wild nature of some of the foxes renders them exceedingly sensitive to strange sights, noises and smells, all ranches are closed to every one but the keepers. The keeper usually wears the same overcoat when about the pens. All domestic animals are kept at a distance from even the outer fence. Strangers are warned not to approach the ranch premises on pain of being fined for trespass. In

New Brunswick and Quebec, laws have been passed making it an offence punishable by a heavy fine to approach near a fur ranch.*

The keeper should move cautiously and quietly about the pens when feeding. He should have a post of observation from which he can see the pens and yet not be seen. A dark chamber with a hidden approach and a small window to look through may serve. From this post an experienced breeder can ascertain when mating occurs. At the earliest, whelping will take place fifty days after mating, though it may be fifty-two days, or, in rare instances, fifty-three or fifty-four days, especially with the first litter. Fifty-one days is the usual period of gestation.

**Removing
the Male**

If the keeper plans to remove the male, he should have the pens built in such a manner that the male may be shut out (away from the female, though with only a fence or double wired fence intervening) without a suspicion on the part of the foxes of design in such a removal. The action of some breeders in entering the pen and catching the dog with tongs or catching box is universally condemned as very dangerous at this period. If the male is kept close by, he will watch and warn whenever he fears danger and, moreover, he takes an interest in the rearing of the young—frequently carrying his food along the fence, apparently with the intention of giving it to the female and the young.

**Calming
Excited Mothers**

It is not usual for parent foxes to kill the young intentionally, but, when they become nervous, they want to remove the pups to another place. A mother will frequently become greatly excited and, dashing into her nest, will carry out the pups one by one and bury them in the snow or mud. This frequently occurs and is the great fear of ranchers in the spring months. It is difficult to tell what to do in such an emergency, except to see that the foregoing preventive measures are taken. The measures suggested in the following paragraph have been successfully carried out in more than one instance.

A crate of chickens or rabbits should be kept near at hand so that if a mother carries her young about, a live chicken or rabbit may be put into the pen to attract her attention and turn her from her impulse of hiding the young elsewhere. One breeder says that he stopped one mother with an egg which he threw in front of her from outside the fence when she was carrying out her pups.

Some ranchers, during the whelping season, always keep posted regarding the whereabouts of at least one cat with young kittens. If the

*See Appendix V.



1. FOX KITTENS TWO WEEKS OLD
2. A THREE-QUARTERS BLACK FOX BADLY FRIGHTENED; NO HIDING COVER TO RETREAT INTO
3. KEEPING WATCH ON THE STRANGERS
4. A NORTH SHORE (QUE.) FOX IN AUGUST

mother fox proves to be not capable of rearing her young for any reason, they are taken from her and reared on the cat until four or five weeks old, when the cat will usually desert them. They are then able to lap milk. Young foxes have been found stiff and cold, but by warming them in hot cotton wool and providing them with feline wet-nurse, have finally grown to maturity. A nursing bottle and a medicine dropper also might be kept on hand to feed milk.

Data for Breeders The young are blind for about three weeks and do not leave the nest, but when they are about four weeks old, the mother carries them to a sunny place. They soon learn to lap milk and eat. When about three months old, the mother weans them and they may go to quarters of their own.

Foxes have only one litter a year, each litter consisting of from one to nine pups. The earliest noted litter came on March 12; the latest, on June 4. No instances are yet recorded of two litters in one year, but it is believed that it may occur within a few years when the animals are more domestic in habit.

According to the best authorities, foxes in the wild state are monogamous. In captivity, they are usually paired for life, and in many instances re-mating is said to be impossible. In some cases, however, foxes can be re-mated yearly. Some males will mate with several females during the same winter. Two systems of double mating are practised. Under one system, a male and two females of the same litter are given the run of three pens. After mating they are all separated into their respective pens. The other system also requires the use of three pens, the male spending alternate days with each of the two females. When mating is effected in these ways, success is not as certain as with single mating.

The fox continues prolific until about ten or eleven years of age. If a pair fail to produce young after the eighth year, they are usually slaughtered. In the majority of cases foxes mate when ten months old. Some breeders endeavour to mate a young female with a male a year older.

Hygiene and Diseases No serious diseases were observed in foxes on Canadian ranches. No sick fox was seen except one that had produced no overhair and appeared to be in very poor condition generally. It was probably the type known to hunters as the Samson fox. Evidence furnished by R. E. Hamilton of Grand Valley, Ont., who once had one in similar condition in his possession, indicates that the lack of fur and the poor condition is caused by a tape-worm. Mr. Hamilton cured it by administering a violent vermifuge, using a biscuit vermifuge, puppy doses.

Writers report that rabies and canker of the ear have been known, but no evidence of these diseases was found during the present investigation. Mange is also mentioned and probably exists. The usual remedies applied in the case of dogs seem to be effective wherever used and they are usually put up in a form easy to administer.

The following quotation from a letter from Spratt's Patent, Ltd., who manufacture dog biscuits and medicines, contains a number of useful suggestions for the rancher:

"In our pamphlet on dog culture, you will find chapters on all the diseases mentioned in your letter. If foxes, also, are subject to these diseases special precautions will have to be taken. Besides being wild animals, we presume they live in artificial or natural earths, and you can readily understand that, when an animal is suffering from ophthalmia, special precautions will have to be taken.

"The same applies to mange; otherwise, all the animals will soon contract the disease.

"When the animals are from four to six weeks old, they start changing their milk for permanent teeth and bone is a useful article to give, as this helps the shedding of the milk teeth. Sometimes, of course, they are so firmly imbedded in the gums that forceps must be used, and should you find an animal's head swelling, we strongly advise you to examine the mouth and remove the milk, especially the canine, or eye, teeth."

Dr. Alexander Ross, of Charlottetown, formerly of Alberton, P.E.I., who has given much attention to fox diseases and their treatment and has acquired a rare experience in treating foxes on the numerous ranches situated within his practising territory at Alberton, has written the following article on fox diseases and surgery for this report:

"Foxes bred in captivity are more liable to disease than those which roam the wilds. In confinement they are shut off from various foods they seek in the wild state, particularly when they are not well. They are also limited as to exercise, so their muscular tone is usually below par. They often show malformation in the bones of their limbs (rickets) which, I think, is due principally to their food being deficient in bone salts and to restricted exercise. On the whole, however, I have found, in an experience extending over fifteen years, that the colonies of foxes in Prince Edward Island are remarkably free from diseases.

"Quite a few show rickets which is due largely to the kind of food they get. In those ranches where proper care is taken, very few of them have this disease. Where they are bred simply for quality of fur without due regard to physique, where they are in-bred, and especially when they are not properly fed, they are liable to develop rickets. Ground bone, lime water or cod liver oil and hypophosphites of lime and soda administered with their food will help to arrest the disease at its beginning. Abundance of fresh air and sunshine should also be provided.

Disorders of Digestion "Foxes in confinement are prone to suffer especially from disorders of digestion due to lack of knowledge in feeding them. The following are a number of the more common of the diseases of the digestive organs, together with directions for treating them:

"*Diarrhoea*.—If severe, give a purge of castor oil with a few drops of spirits of turpentine, followed by 10 to 20 grains of bismuth every two hours till the animal is better. The castor oil dose may be repeated more than once in smaller doses if the diarrhoea persists. At the same time, the food should also receive attention. Meats should be restricted, and milk, biscuits and eggs given. No food should be left in the feeding-pans more than a few hours and the pans should be scalded out frequently.

"*Constipation*.—They do not suffer much from this disease. It can be overcome largely by means of dieting. A dose of cascara acts well, and, when needed, injections of soap suds may be given.

"*Worms*.—Pups are especially liable to worms. Indeed, I have seen the whole intestinal tract full of worms. These often cause fits. Fast the pup for eight or ten hours and give a dose of castor oil with a few drops of turpentine. Also give santonine—one-third of a grain to a pup six weeks old. Repeat every other day till the pup is well.

"*Indigestion*.—In pups this is liable to cause fits. The young ones will not eat; their coats lose sleekness and they become listless. If not promptly treated, they die quickly. Give castor oil and turpentine and feed judiciously. This can only be done by separating the ill from the well.

"I have met with no case of disease of the respiratory organs.

"There have been no epidemics of any kind among the foxes of Prince Edward Island. Now and again, a grown fox has died suddenly. Usually the fox seemed to be quite lively, and in a few hours the keeper found him dead. I performed autopsies on three or four of these and could in no case be certain of the cause of death. In one case, I found some congestion of the lung, which I regarded as post-mortem. In an-

other, the gall bladder was abnormally distended. Most of them showed some redness of the alimentary tract. I am of opinion that death was due to some food poisons—ptomaine. In one animal that died there was a jelly-like fluid between the pelt and the flesh of the hind legs.

“When pups are shedding their milk teeth—usually at the age of three months—abscesses are liable to form at the roots of the tusks. The fox then swells around the snout. In such cases the tusks, which are quite loose, should be extracted. Give them large bones to gnaw so they can knock out these teeth. This will usually prevent the formation of these abscesses.

“*Fleas and Moths.*—Dip the fox in weak solution of creolin in order to rid him of these pests.

“*Fox Surgery.*—I have had more to do with foxes in a surgical than in a medical way. They frequently break their limbs in fighting among themselves or in an effort to escape by climbing their enclosures. These fractures are usually compound and necessitate the amputation of the limb. The flesh is stripped back and the protruding bone is snipped off with bone forceps. The wound is dressed antiseptically and the flesh is stitched over the bone. The whole part is well dusted with iodoform, and wrapped in gauze bound on with surgeon’s adhesive plaster. The fox will not touch the dressing when dusted with iodoform. The operation is simple, no anæsthetic is needed and there is no danger from bleeding, because, as a rule, no arteries have to be tied. In fact, it is dangerous to give an anæsthetic.

“When the fracture is not compound, the limb may be set in splints of any light wood; maple saplings make good splints. Bind the splint on with adhesive plaster and with rabbit wire; the fur makes sufficient padding for it. Dust with iodoform to keep the fox from tearing the splint off. In winter, care must be taken that the leg does not freeze.

“Judicious feeding can only be learned by experience. Grass and other green food and fresh earth should be placed in the enclosures at frequent intervals, as the animals require something of that nature to keep them healthy. Their kennels should be kept as clean as possible and should be washed out once or twice a year with a hot solution of creolin, two drams to the pint. One breeder dips all his foxes, after the pups are weaned, in a weak solution of creolin to rid them of fleas and other vermin.

“In general, it is far better to take good hygienic precautions before the foxes get sick, than to invite disease by having them live in filth in small enclosures.”

Dangerous Fox Diseases

In 1912, vague reports were circulated among the breeders of Prince Edward Island that a contagious parasitic disease was being introduced by blue foxes imported from Alaska. A definite warning was furnished the Commission of Conservation by an eminent United States authority that such a dangerous disease exists and would prove fatal to the fox industry if introduced; but few details of the disease were presented. A letter of inquiry was sent to Mr. George M. Bowers, Commissioner of Fisheries, Department of Commerce and Labour, who has charge of the conservation of foxes and seals at certain points in Alaska. The reply under date of November 25, 1912, is as follows:

"The Bureau has not been informed of any particular parasitic disease as existing among the foxes of Alaska. So far as known, fatal disease has been so rare as to be negligible in the consideration of fox raising. Improper feeding, accidental poisoning and tuberculosis have been known to cause the death of individual foxes, but nothing in the nature of an epidemic has been reported."

Capturing Escaped Foxes

As already stated, the capturing of escaped foxes presents little difficulty provided they do not get outside the exterior fence. They will often, of their own accord, return through the open door after a few hours. Or, in the cases where escape has been over snow banks, they will usually return when hungry. They may be driven into the alleys from the outer enclosure when a temporary fence of meshed wire is stretched across from the pen to the outer fence. They can also be caught in the box traps, or in steel traps which have the jaws wrapped with muslin so that the limbs will not be injured. A live hen or rabbit makes excellent bait. The latter method will often prove effective when the fox has escaped to the woods, as they are likely, especially if ranch-bred, to remain in the vicinity of the ranch.

The ownership of an escaped fox is a disputed point. Many people contend that a fox roaming at large is game for anyone, but, if the ranchman can identify the live fox or the skin, he can recover it as his personal property.

Marking for Identification

Ranchmen have given serious study to the question of marking for identification. A numbered aluminum tag, which may be seen at a considerable distance, is often fastened into the ear. In some way, however, the fox manages to get it off. Marking the teeth by filing or tattooing them is also resorted to, and has, at least, proved practicable. But the disadvantage of not marking the skin is obvious. A possible method, not yet attempted, is to tattoo the skin with the owner's number or brand, which could be

stamped into the hide where it is least valuable. The brand could be registered, and the skin or the live animals thus identified. If such a method be practical, it would have the additional advantage of being undiscoverable by thieves and of rendering it possible to identify the skin on the open market.

Catching and Handling The catching and handling of foxes in their pens present little difficulty. Expert ranchers will catch and handle them without gloves or instruments, but the ordinary rancher provides himself with a pair of tongs the jaws of which will close to a diameter of two and a half inches. The fox is shut into his nest, when the cover is lifted, is grasped about the neck with the tongs. The fox may then be carried away on the arm and the rancher be in no danger of getting bitten. A catching box is also useful. It is made just large enough to admit the fox and has a slide door at each end. When it is placed at the end of the entrance to a house with one slide door opened, the fox may be driven out of the nest into it. The slide door is closed and the fox is thus trapped in the box. If the catching box be made of stiff wire-mesh sides and top, the fur can be closely examined. In the case of the latter type of construction, however, the fox might not readily enter it unless a blanket was placed over the box to darken it.

When foxes are transported, they are put into a box which is lined with meshed wire so that they cannot escape by gnawing their way out. They can be kept without water or food for days, but are generally fed water biscuits or a bone and are watered, a can being nailed on the interior for that purpose. Express companies are obliged to feed them if food is provided.

When foxes are brought to their pens for the first time, they should be liberated by making a small opening in the box and holding it up to the entrance of the kennel. They will then enter their nest and, after a minute's inspection, will come out into the pen. By this time, the keeper can be away out of sight, and none, or very few, will attempt to climb the wire or rush against it. If pens are provided with cover and built in secluded woodland, the wildest foxes will not climb the wire if the keeper is competent and no strangers are admitted.

Slaughtering for Fur No foxes except a few old ones and culls were killed in Prince Edward Island for their pelts in 1910, 1911 or 1912. The pelt of a fox becomes prime in November, but is not as heavy then as in December. They are killed on Prince Edward Island in the last week of December. An eight months old fox is said to have as full and large a skin as an older one. Some breeders, how-

ever, disagree with this common opinion and say that one year and eight months is the proper age at which to kill them.

The fox when young, has less silver than in later years and this is an advantage in the present market, silver skins being more common than pure black. It is hardly necessary to remark that no fox should be slaughtered without a careful examination of his coat, and, if it be light and thin and the fox only a pup, he should be spared for a year in order to improve his condition if possible.

Considerable care should be taken against injury to the coat during the months previous to killing. They should not be allowed to lie on damp places and thus have the guard hair frozen into the ground or snow and broken. Smooth, large passageways should be provided. Fleas or mange or other skin affections or parasites should be prevented as they would induce scratching and thus wear off the hair on the shoulders and hips.

It is claimed that heavy feeding of nutritious laxative food like molasses, patent food preparations, boiled barley or oats, will fatten the fox and improve the gloss of its coat. Some of the costliest skins marketed were taken off foxes with one quarter of an inch of fat over their ribs. This is contrary to a popular, but incorrect, impression that starving makes the hair longer and improves the coat.

Foxes are killed by crushing the chest walls. They are placed on their sides, and the slaughterer places the sole of his foot immediately behind the foreleg and bears down with his full weight. They are also killed by forcing the head back until the neck breaks. There is a danger that the sheen of the overhair—especially the silver hairs—may be somewhat injured with blood and dirt so that clean quarters and methods of killing are essential.

The information available indicates that the adoption of some more humane method of killing, such as the use of chloroform or ether, would not injure the fur and, at the same time, be far more merciful. A small padded box with a wad of cotton batting in one of the upper corners upon which chloroform could be dropped from a hole in the corner of the box would be all that would be required. As soon as it is dead, the animal should be removed from the chamber. In the case of such a valuable animal as this, it is not too much to expect of ranchers that they provide one of these inexpensive lethal chambers.

Poisons that are available are: cyanide of potassium, prussic acid, strychnine and white arsenic. A very small quantity of cyanide or of prussic acid will kill the fox instantly, but, as these drugs are excessively poisonous, it is dangerous to have them in one's possession unless

securely locked up. Strychnine and white arsenic do not kill immediately, and, if another animal ate the flesh of an animal poisoned by them, it would be poisoned in turn.

The cased method of skinning, described elsewhere, is used.* The only difficulty will be with the forelegs and tail. The forelegs become stiff and hard in a short time and should be turned fur side out after a day or two. If the tail bone is not wholly removed in the first attempt, the tail may be slit down the under side. The skins are marketed fur side out and are sewed up in muslin and packed flat in a box.

Judging a Silver Fox Skin The condition of the pelt in respect to primeness, proper killing, skinning, drying and shipping is important. Skins may be blue or unprime; springy, when the hips and shoulders are worn and the hair loose; dirty, shot, chewed, heated, or greasy. In such cases their value is largely decreased.

The skin value of the live animal may be judged from the following standards:

Colour.—Glossy black on neck, and wherever no silver hairs are found. The black must be of a bluish cast all over the body rather than a reddish. The underfur must also be dark-coloured. The fur of silver and black foxes is a dark slate next to the skin.

Silver hairs.—Pure silver bands—not white nor very prominent. In the costliest skins there are only a few silver hairs, which are well scattered over the pelt. The neck and head should be clear black. Flakiness, which is the appearance of whitish silver hairs placed close together in patches, is objectionable.

Gloss.—The sheen must be evident. It is caused by the perfect health of the animal and the fineness of the hair, as well as by hereditary influences. Woods and humid atmosphere also favour this important quality.

Weight.—A good fox skin will weigh at least one pound, the weight usually varying from ten to nineteen ounces. The thick, long fur makes the weight. This is a very important point, as heavy fur is more durable and handsome.

Size.—The value of silver fox pelts increases with the size.

FINANCIAL ASPECTS

The amount of capital required to finance a ranch containing even three or four pairs of foxes, involves the organization of companies or ex-

*See page 97.

tensive partnerships among people whose experience and location are suitable for fox ranching. In the autumn of 1912, at least \$50,000 was required to build, equip, and stock a ranch in Prince Edward Island with five pairs of first-class stock. Many ranches have been equipped for less money, but either cheaper wild or unselected stock from Newfoundland or elsewhere was purchased, or options had been taken at an earlier date on pups for delivery at that time.

**Options
on Stock**

Because of the keen demand for breeding stock, it has been customary to sell options for future delivery. Usually the options are taken on the unborn pups, and 10 per cent. of the price agreed upon is paid when the options are taken. Time of delivery is made the essence of the contract and, if the rancher has not as many pups as he has sold options for, the orders are filled consecutively; i.e., the earliest orders are filled first. In case delivery cannot be made, the agreement provides that the deposit must be returned with 6 per cent. interest per annum. In 1912, options were sold on more pups that could be delivered because of the unusually small number of pups. At the present time (December, 1912), many options on 1913 stock at an average price of about \$10,000 per pair have been sold. As large ranchers carefully number the options, the holder of the first option has the best chance of securing the choice of pups when the deliveries are made.

All over North America wherever the common red fox is found, agreements are being constantly made with lumbermen, miners, missionaries, fur traders, trappers, government officials and others for future delivery of wild animals captured in their respective districts. The supply of fur, however, will not be appreciably diminished by the capture of wild fur-bearers alive.

**Sales for
Breeding Stock**

In 1911 and 1912 all available foxes were sold for breeders. The first general sales were made in 1910, at prices not far above the fur-value, viz. about \$3,000 to \$4,000 a pair. In 1911 the price rose to \$5,000 a pair, and, about littering time in 1912, one pair was sold for \$20,000. This, however, was for a pair of excellent proved breeders, which, a few weeks later, produced five whelps which were sold for \$20,000 in August, 1912. By September 1, when the deliveries of stock began, the price was \$8,000 a pair for pups and a month later, \$11,000. By December, 1912, \$12,000 and \$13,000 was the ruling price, with few sales. Old proved breeders of good quality were valued during the last months of 1912 at from \$18,000 to \$35,000 a pair.

It can thus be readily understood how highly speculative fox trading is at the present time. The tendency towards inflation is encouraged and fostered by many of the older breeders. Their optimism is accounted for by the fact that they have become wealthy in the last three years, whereas six or eight years ago, some of them possessed only mortgaged farms and a few foxes. All but three or four have made their fortunes by selling breeding stock and, with the exception of, possibly, \$200,000, obtained for pelts, all of the million or more dollars received by ranchers has been made in this way.

Futures The present system of buying for future delivery is another indication of the optimism of investors. In December, 1912, many of the unborn pups of 1913 were purchased and partly paid for, delivery to be made in the first week of September, 1913. The difference between purchasing futures in foxes and gambling in futures in May wheat or October cotton is more apparent than real.

Craze for Ownership Naturally, the rapid rise of such an industry has unsettled the peaceful rural conditions in a country like Prince Edward Island. Farmers are using the credit of their farms to purchase shares in silver foxes, or to buy outright cross foxes, red foxes, blue foxes, minks and any other fur-bearer likely to prove profitable. The banks report a serious withdrawal of deposits and realization upon outside investments, while the lawyers of the little town of Summerside, P.E.I., are reported to have recorded about \$300,000 in farm mortgages in 1912. A goodly share of the savings banks deposits made by these prosperous islanders has also been withdrawn.

Remarking on the great craze for shares of stock in fox ranches and for fox ownership, Wesley Frost, the United States consul at Charlottetown, wrote to his government in December, 1912:

"In adjudging the soundness of the present position of the fox industry on Prince Edward Island it should be borne in mind that the community is an intensely conservative one, composed of Scottish and English farmers, intelligent and fairly educated, and with a per capita savings deposit figure to compare with almost any portion of the civilized world.....

"It is true that a large number of the foremost citizens of the Island refuse to participate in the fox boom to any degree whatsoever. Every large sale by one of the big ranches is hailed as an effort to unload before the tide turns. Investment at the present time is regarded as an attractive speculation—but with the speculative element too conspicuous. Granting nearly all that the fox men say, the sceptics fear that, in the readjustments involved in

getting back to the pelt basis, the industry will injure many of its followers.'"

Pro and
Con

It is maintained by some that the present craze is similar to the Belgian hare craze in America and the tulip craze in Europe, both of which collapsed with a heavy slump. It is contended that fox fur is only a poor quality; that silver fox has never been bought in large quantities and that, if production is increased, it will become as cheap as rabbit; that wild foxes do not decrease in numbers when a country is settled; that investments usually yield from 2 to 10 per cent per annum and that, therefore, the large profits made by fox ranchers during the season of 1912 were abnormal. A smaller proportion state that the fox boom was promoted by exaggerated statements respecting the prices received for pelts and by other misrepresentations. They assert that many of the skins marketed have not brought over \$50 or \$100 each and that a large proportion of the foxes now in captivity is of little more value than red foxes. They also state that the demand for silver fox has been supplied and that the Russian nobility and some other Europeans are the only ones who will pay a high figure. It is also maintained that skins of ranch-bred foxes have not the gloss and quality of the product of the wilds.

On the other hand, it is stated that the supply of valuable wild silver fox captured is decreasing, that the demand for costly natural furs is rapidly increasing; that only a few hundred silver foxes are in captivity and that there is ample time for readjustment of values before enough are reared to warrant marketing for fur. The fact is also pointed to that the domestication of fur-bearers has been predicted and attempted for centuries and that those who achieved the work are entitled to reward. Furthermore, it is claimed that when fur is so valuable no animals will be sold unless enormous prices are paid; that it is proved that the fur is better in all respects than the wild product and that the best foxes have not been yet sold and will bring higher prices than the present high record, viz. £580. In addition, the best customers are millionaires and not the nobility.

A general comment is all that can be made on the arguments advanced. Some of the points are discussed elsewhere in this report, notably those respecting the prices obtained for ranch-produced furs as compared with the wild, the decline in numbers of the natural wild supply, and the general excellent quality of ranch-bred stock as compared with the wild stock.

The increased demand and its causes have already been discussed and little remains to be said on that subject. It is possible that silver

fox will become even more fashionable than at present and that the demand will thus be increased, but no one can forecast definitely what fashion will do. It should also be noted that the Russian sable, chin-chilla, sea-otter and seal will be off the market for several years and, on this account, an increased demand for the fur of the silver fox may be created.

The imitation of silver fox is also impossible because of the colours of the silver-banded black overhairs. The nearest imitation is the German-dyed pointed fox, made from a common red fox dyed black, which has white hairs from the badger or other animals sewed into it or fastened in by adhesives. It is easily distinguished from the silver fox fur and is not favoured except as a medium-priced article. It is not nearly as beautiful as silver fox. The silver band in a genuine skin is not white, but silvery, and the whole skin possesses a gloss not equalled by a dyed product. The dyeing process, also, has the disadvantage of rendering the fur less durable.

With regard to the statement that much of the stock is of poor quality and low-priced, it must be admitted that this is true. While statistics of the low prices obtained for pelts obviously could not be secured, it is quite probable that at least 30 per cent. of the silver foxes would bring a price of from \$50 to \$500. At the present quotations, probably another 30 per cent. would be priced between \$500 and \$1,000 and the other 40 per cent. would bring from \$1,000 to \$4,000 each. The ability to recognize a cheap grade of fur instantly is essential in the present state of the business as traders represent a silver fox as such regardless of quality; and, usually, only a short and distant examination of the animal is possible. Besides, the sales are made at a season when the fur is not in prime condition to pass judgment on.

If wild foxes do not decrease when a country is settled, it is not recorded that they increase. The number in unsettled regions, however, is diminishing.

Profits in the industry so far have been large, but, except from the point of view of the individual, the dividend on the money invested is not the main consideration. From the social and economic viewpoint, the discovery of how to breed high-grade foxes is what is important. It is akin to an invention; but, as it cannot be patented, the neighbours of the inventors have become the promoters of a new method of producing a marketable commodity. No huge factories can be built in a few months to manufacture the article to the limit of demand; only the natural law of increase of foxes which is not much over 100

per cent. per annum can be utilized. Thus, it will be several years before the supply will meet the demand, as it is sure to do eventually. If the investing public can be made to believe that future profits are assured, it is human nature to ask as large a premium on the shares of fox-ranching companies as can be obtained.

The stories of the predilection of the nobility of Russia and of other countries for expensive furs like silver fox, sea-otter and sable are mostly drawn from the imagination. The current story that gold is tipped on silver fox overhair was unknown to any of the furriers interviewed, some of whom have been purchasing furs in Europe and America for many years. The story of the Royal Russian furs is doubtless derived from the fact that certain sable and other costly furs were formerly given as tribute to royalty. Ermine happens to be a royal fur and is demanded at coronations and great court ceremonies, yet it is stated that much of the so-called ermine at the coronation of King George V was really rabbit. The best customers of silver fox will be fashionable ladies who will use it in trimmings, stoles and muffs.

Because of the removal of foxes to new ranches in September, October and November while this investigation was proceeding, no very exact data could be procured regarding the number of silver foxes. The following is an estimate of the number in captivity in each province in October, 1912:

FOXES IN CAPTIVITY IN CANADA IN 1912

	Silver	Cross	Bastard and Red	No. of Ranches
P. E. Island.....	650	150	1,000	200
Nova Scotia.....	32	30	150	13
New Brunswick.....	30	10	50	8
Quebec.....	40	10	50	6
Ontario.....	30	40	150	14
Other provinces and territories.....	18	10	50	..
Total.....	800	250	1,450	241

The silver fox industry is centred about the following points: Alberton, Summerside, Charlottetown and Montague in Prince Edward Island; Port Elgin in New Brunswick; Piastre Bay on the north shore of the Gulf of St. Lawrence, Quebec city in Quebec, and Wyoming in Ontario. The number of silver foxes within driving distance of each point is approximately as follows: Alberton, 300; Summerside, 200; Charlottetown, 100; Montague, 25; Port Elgin, N.B., 25; Quebec city, 20;

Piastre Bay, 20; Wyoming, Ont., 12; Carcross, Yukon, 18. In the United States there is a silver fox ranch at Dover, Me., and another in New Hampshire. One was reported from Copper River, Alaska. In Russia there are none.

The Increase in Numbers Since, under present ranching conditions, silver foxes increase in numbers approximately 100 per cent. each year, it seems evident that the present prices for foundation stock must decline to near the pelt value before many years. The price of the scrub stock and of specimens with the poorer grade of skins will decline first. It is likely that this inferior stock will be used for mating with red and cross foxes which, by the year 1916, should be producing a large number of silvers, mostly of poor quality, however.

Final Value of Silver Fox With regard to statements frequently made that silver fox will be as cheap as rabbit if produced as numerous, the point is not worth discussing, since production will not increase beyond the point where a profit can be made. The London importation of rabbits is now over 80,000,000 skins annually and Australia uses thousands more weekly in her great felting industries. An attempt was made to secure expert opinions from qualified furriers as to the final value of silver fox pelts when they are produced in as large numbers as those of red foxes are now. The consensus of opinion was that because of its greater beauty and more favoured colour, silver fox fur would be three times as valuable as red fox, natural black furs not occurring commonly in nature. In this connection it must be remembered that all ranch silver foxes are killed when the fur is prime and no injury whatever is done to the pelt, so that their pelts would be worth from \$40 to \$80 each for No. 1 skins at the present valuation of the pelts of red foxes from Northeast Canada. But it will be a long time before the production of silver foxes will approach to the number of even high-grade red foxes marketed yearly. The total number of skins, according to the estimates of E. Brass is 1,337,000 yearly for the common fox. Even if the pelts fell to \$30, foxes could be raised profitably by a farmer who maintained other live stock. In many districts the annual cash outlay per fox for food need not exceed \$5, and attending to twenty foxes would not involve as much labour as attending to ten cattle. If fox ranch fences cost more, the land and houses cost much less. The fox, moreover, reproduces rapidly and comes to maturity in eight months.

Because the silver fox has never been produced in considerable numbers, it has been impossible for furriers to carry a stock large enough to warrant advertising it and featuring its sale. It has been

difficult to obtain even two matched skins at one sale. Under the new conditions, when thousands of skins may come to the market season after season, matching will be easy, and the best fur stores can carry in stock enough silver fox to warrant the featuring of the stock.

Organizations Among Producers An opportunity is now presented to the ranchmen to unite into a strong co-operative association to protect and promote the industry. Frauds could be exposed, breeding records kept, thieves arrested and prosecuted, legislation secured, the product advertised and the whole market situation studied. The publication of inexact and fanciful statements by promoters of stock companies is also injurious to the industry's future.

The better protection of the stock from thieves can be achieved in two ways. First, the provincial trespass laws could be amended to increase the fine for trespassing near fox ranch property.* Second, the criminal code could possibly be revised so as to cause the exterior fence of a fur-farming ranch to be regarded in law similarly to the walls of a barn or dwelling, and anyone found inside the fence would be guilty of burglary and might be trapped or otherwise captured. These amendments, or others of as effective a nature, might be secured if representations were properly made to legislative bodies by a strong organization.

Because of the mixing of various strains of foxes, it is difficult to secure reliable "performance" records of stock. The only "performances" worth noting in foxes are the prices of the pelts of the ancestors, and such features as fecundity, beauty and weight of the pelt and size. Well-organized provincial associations could keep performance records, and the various provincial organizations could co-operate with the Federal Department of Agriculture for registration.

Quarantine is a question that may, at any time, become of prime importance. Thus, if disease breaks out in any district, the Federal Department of Agriculture, if requested by a strong association of breeders, might be induced to undertake a quarantine.

The whole problem of the protection of wild animals and the possibility of propagating them in captivity are broad questions that require more attention than has been given them in the past. A Dominion Furriers and Fur-Farming Association organized along similar lines to the Canadian Forestry Association, and like the latter, publishing its own journal, could do much to promote a healthy interest in protecting and propagating wild life. The organization of provincial associations would be the first logical step in such a movement. To establish a per-

*See Appendix V.

manent, national organization, representatives of the fur trade, the fur farms, the game wardens and commissioners, and the government experts could be called together.

POLAR OR ARCTIC FOX

(*Vulpes lagopus*)

The polar fox is found in the high latitudes. It is of two colour phases—white, and the so-called blue, which is really a slate-coloured gray. The white fox is brown in summer with the under parts lighter or drab. The white winter coat has a pure white long over-fur with an underwool of a darker colour. The blue phase is of a gray-slate colour all the year round and is found more abundantly in the southern portion of the range of these foxes. It is said to exist in Greenland and Iceland. The number of blue fox pelts sold annually is about one-tenth of the number of white fox, and they sell for several times as much, bringing, at present market prices, from \$20 to \$75 each, and even higher for choice pelts.

A considerable number of blue foxes were imported into Canada during the season of 1912. Possibly a hundred or more were brought into the Maritime Provinces from Alaska, where feeding is now difficult because the killing of seals is not permitted. One consignment numbered thirty-two and arrived in very fair condition. They were sold to ranchers at about \$800 a pair. No information was obtained to show whether the experiments in breeding these animals in their new environment had been successful or not.

Blue Fox Farming

The following account of blue fox farming is taken from "Fur Farming for Profit," published by the Fur News Publishing Co., of New York:

"For some years past the blue fox has been successfully raised in rather large numbers on several small islands off the coast of Alaska, and for a shorter period on the mainland. The blue fox thrives and multiplies in captivity, and can be raised with rather more satisfaction than the other members of the fox family, as it is more tractable and easily managed. An island makes an excellent blue fox farm for various reasons; there is no large outlay in cash for fencing; as the islands are surrounded by the sea, the water does not freeze over in winter and the foxes cannot leave the farm; no danger is to be apprehended from the intrusion of other animals; a considerable supply of food may be obtained from the sea, which is to a considerable extent self-supplied; crabs are found along the shore, fish are washed up on

the beach from time to time, and other food is found on the islands. While a number of the islands are now occupied by blue fox farmers, there are many more that are available for the purpose, and which can be leased from the United States Government on reasonable terms. Farms on the mainland may be enclosed with wire fencing, and need not be larger than 50 feet by 50 feet. For raising the foxes on a larger scale than would be possible in an enclosure of the above-mentioned area, several little farms, adjoining each other, may be fenced off.

"Blue foxes breed once a year, mating about February 1, and the young are born near the end of May, the litter comprising from three to seven. Artificial dens or hiding places in which the foxes may remain secluded at will are provided.

"Food for the blue fox includes fresh, dried and cured fish, crabs, fresh meats obtainable in the vicinity of the farms, cooked corn-meal cakes made of a mixture of corn-meal and chopped dried fish, and meal, tallow and fish preserved in oil.

"Food should be supplied to the animals most abundantly from the first of July to August, as at that period the care of the young foxes makes it necessary for the old foxes to be better fed than at other times.

"The price of blue fox skins is about \$30 each, and even more is paid for well-coloured, full-furred and properly handled pelts.

"Stock for beginning may be procured from persons raising blue foxes on the islands at a cost of somewhere near \$200 per pair.

"The Secretary of Commerce and Labor has authority to lease for the purpose of propagating foxes, such islands in the waters of Alaska, excepting the Pribilof group, as have been so leased by the Secretary of the Treasury prior to May, 1898. The rental in the past has been one hundred dollars per annum for each island."

The blue fox is a better climber than the red and an overhang wire of 36 inches is required. Otherwise, the pens are built similarly to those of the common fox.

Rate of Increase The rate of increase of blue foxes is said by Ernest Thompson Seton to be good index to the increase of red foxes. He says: "St. George island, about 36 square miles, has about 270 pairs of foxes, and although they are fed and protected and the species has 5 to 12 in a litter, not more than 400 to 500 can be marketed each year without reducing the stock." The figures are about correct for the annual increase of the silver fox, despite the claims of some ranchers of an average annual increase of from 200 to 300 per cent.

Maj. Gen. A. W. Greely, in his Handbook of Alaska, published in 1909, writes:

Additional Details "Unwise exploitation has very greatly reduced the fur-bearing productivity of the land animals of the Aleutian islands, as well as of the interior of Alaska. With the early extermination of foxes in prospect, there was organized about 1894 the Semidi Propagation Company, to domesticate and raise foxes on uninhabited islands. The original fox farm was stocked from the Pribilof group and was situated on North Semidi island, whence the industry has extended to thirty or more islands to the eastward, far the greater number being situated in Prince William sound, though there are seven in the Kadiak group. Most of the islands are occupied under lease from the United States, and the law excepts from homesteading the fox islets. The companies and several individuals have followed this industry, which has been only moderately successful from the financial standpoint. Considerable investment is necessary, it takes at least four years before any revenue is obtained, the life is most isolated, and skins are not very productive, usually varying in value from \$10 to \$20, according to quality and demand. In some instances natives have become fox breeders and, where private parties are so engaged, they have supplemented their fox breeding by fishing, farming, or lumbering.

"The largest fox farm is at Long Island, near Kadiak, where there are nearly 1,000 blue foxes. The largest number of skins comes, however, from the Pribilof group, where about 700 foxes are annually taken by the natives, supplementary to the fur-seal catch. These foxes are not domesticated.

"The very valuable silver-gray fox is too thoroughly savage to accept conditions necessary for profitable fox breeding and, in consequence, fox farming is confined almost entirely to the blue fox. The fox is monogamous, and an average of four foxes come to maturity from each litter. It is necessary to feed the foxes the greater part of the year, and careful supervision is essential to their successful raising.

"The blue fox thrives wild on the extreme easterly isle of Attu, and from that point several of the Shumagin islands, Chernabura, Simeonof, etc., have been stocked with moderate success. The extension and development of this industry is desirable as one of the much needed means to enable the Aleuts the successfully to meet changed conditions of Alaskan life."

BLUE FOX BREEDERS IN ALASKA*

Island	Locality	Name of Breeder	Post-office Address
Little Naked...	Pr. William sound.	Walter Story.....	C/o Alaska Packers Assoc., San Fran- cisco, Cal.
"	"	Olaf Carlson.....	"
"	"	Louis Carlson.....	"
"	"	Fred Lilyogren.....	Ellamar, Alaska.
Big Naked....	"	James McPherson....	"
"	"	Edward Elk.....	"
Fairmount.....	"	William Byers.....	"
Bligh.....	"	Pres. Cloudman.....	"
"	"	William Busby.....	"
Goose.....	"	George Donaldson....	"
"	"	Louis Thorstensen..	"
Greene.....	"	Peterson & Brower..	"
Long.....	"	George Fleming.....	"
Gage.....	"	George Fleming.....	"
Pond.....	"	A. W. Lind.....	"
Smiths.....	"	James Bettles.....	"
Squirrel.....	"	John L. Johnson....	Orca, Alaska.
Perry.....	"	Kendall & Stering...	Ellamar, Alaska.
Small, near Perry.....	"	Christ Christensen...	"
Glacier.....	"	Peter Jackson.....	"
An island (no name).....	Resurrection bay...	Alfred Law.....	"
Yukon.....	Kachemak bay....	A. R. Ritchie.....	Homer, Alaska.
Cape Elizabeth..	.....	M. F. Wright.....	Seattle, Wash.
Yukawak.....	Southwest of Kadiak.....	Semidi Propagating Co.....	Kadiak, Alaska.
North Semidi...	"	"	"
South Semidi...	"	"	"
Chernobour....	Near Unga.....	"	"
Little Konuishi.	"	"	"
Simeonof.....	"	"	"
Marmot.....	"	"	"
Whale.....	Near Kadiak.....	.....	"
Adronica.....	Near Unga.....	W. L. Washburn.... (Administrator)	San Francisco, Cal.
Long.....	Near Kadiak.....	Semidi Propagating Co.....	Kadiak, Alaska.
Pearl.....	Near Cape Eliz....	Alaska Fox Co.....	"
Dry.....	Near Kadiak.....	Semidi Propagating Co.....	"
Samalga.....	West of Unalaska..	Not occupied.	
Peak.....	Pr. William Sound.	McPherson & Elk...	Ellamar, Alaska.

*From Report of U. S. Department of the Interior, Public Lands Section, House Documents, 58th Congress, 2nd Session.

There also two small islands near Prince of Wales sound not now occupied. The following islands, also, are no longer occupied: Demidoff, Eastern Chugatz, Holliday and Near islands.

Additional light is thrown on the breeding of blue foxes by the

following article on "The Blue Foxes of the Pribilof Islands," by James Judge:

THE BLUE FOXES OF THE PRIBILOF ISLANDS

"The Pribilof islands have many natural advantages as a home for foxes. The innumerable caves and subterranean passages afford the best protection possible against the elements or natural enemies, while the bird, seal, and sea-lion life, with what may be picked up on the beach, have in the past afforded a supply of food rarely found elsewhere. At the present time foxes are about extinct on St. Paul and Otter islands and have been preserved on St. George only through a system of artificial feeding adopted several years ago. This paper deals with St. George foxes only.

Former Food Supply

"In former times the annual quota of seals killed on St. George island varied between 20,000 and 25,000. Hundreds of sea-lions also were killed annually. With the exception of what the natives took for food, these vast quantities of meat were left on the ground where the animals were killed, and during the long period from September to May, these seal and sea-lion fields furnished the foxes with food, when other and more palatable food was not obtainable. Frequently dead whales, walruses, sea-lions, or fish were washed ashore and, when this occurred, the killing fields were abandoned by the foxes, and only resorted to again when this temporary food supply was exhausted. These were practically the conditions under which the St. George foxes lived from the time of Russian occupancy of the island down to 1890. During this long interval, no attention was paid to the animals, except that trapping was indulged in by the native residents, from one to two months each winter when the skins were prime.

Present Food Supply

"During the summer of 1896 I had the natives salt 500 seal carcasses, the meat being preserved in an old silo formerly used by the sealing company. During the following winter, these carcasses were taken out, a few at a time, freshened, and thrown out for fox food. The rapidity with which the foxes learned that food would be set out daily at a certain place and time, and the numbers in which they came for it, surprised everyone on the island. They not only ate the meat but nearly all the bones as well. For an hour before feeding time they could be seen coming from all directions to participate in the feast. While waiting, they prowled around the village picking up everything of an edible nature and many things not edible. They came in greatest numbers when the weather was clear and cold.

"Since that time all seal meat on St. George, not used by the natives, has been salted within two or three days of the killing, and fed to the foxes during the succeeding winter. When taken from the silo it is half rotten, most of the brine having escaped, but the foxes prefer it to fresh beef, mutton, or fish of any kind, as has been learned by experiment. With the exception of three seasons, the catch of seals has been under 2,500 and, as fully half the meat is required by the natives, it has been necessary to supplement the amount allowed the foxes with other food.

"In the spring and summer thousands of sea birds make the islands their home. This is the time the foxes enjoy life to the utmost. The birds are very numerous and, in the early part of the season, many meet death or injury accidentally and, of course, fall a ready prey to the foxes. During the month of May, hundreds of small auklets or 'chooch-kies' in flying to and from the sea, strike the telephone wire and are killed or injured. No sooner do they reach the ground, however, than the foxes are there to pick them up. For the first few days, reynard will eat the entire bird, but later on as he becomes surfeited, he eats only the head and leaves the body untouched. The eggs of birds are a delicacy enjoyed by the foxes. The 'arrie' or murre and other large birds lay their eggs on shelving rocks on the cliffs; and it is astonishing to see a fox climb around an almost inaccessible place, secure an egg and carry it away for its young, to return shortly and repeat the operation.

"By September 1, the birds, their breeding season being over, have mostly left the island, the deaths among seals on the rookeries are few, and marine food is not abundant, so it behooves the foxes to seek food in other quarters.

"One season a mush of either corn-meal or middlings was used; but while readily eaten by the foxes, it was not good for them. Dried fish was tried and found excellent food, and during the last two years salt fish has been in use. Salt itself is deadly to the foxes, so that in feeding salted food, care must be taken to thoroughly freshen it.

"Seal killing begins in June and, as the carcasses are left on the ground, a good supply of food becomes available. It appears, however, that at that season, the eggs and meat of birds are preferred to seal meat, as the latter is seldom touched, while bird feathers and egg shells are to be found along the trails and at the mouth of every fox warren. With the departure of the birds in the fall the foxes follow the shore line in search of food thrown up by the sea, and pay particular attention to seal rookeries, on the lookout for dead pups, which seem to be relished, and are dragged off for the young.

"While the animals eat a great deal of grass and other land and marine vegetation, it is evident that they cannot long survive on a diet that does not include animal food.

Modern Conditions "The year 1890 may be considered the turning point in fox life on the Pribilof islands, which, of course, include St. George. At that time, or soon after, a scarcity of foxes was everywhere apparent, and the government agents in charge, wrongly attributing the diminution to over-trapping, forbade all trapping for three different winters in the early nineties, with the result that the total catch for the seven years ending with 1897 was only 2,198. The real trouble was a shortage of substantial food, such as the foxes had always been accustomed to, but this was not then understood, or at least no steps were taken to supply the deficiency.

"The slaughter of seals upon the ocean by pelagic hunters had so decimated the seal herd, that in 1890 only 6,139 were secured on St. George island, instead of the regular quota of 25,000. In 1891, 1892 and 1893, owing to the *modus vivendi*, the number of seals killed on this island was further reduced to 2,500. The sea-lion herd of the island had likewise been greatly depleted, so that but few of those animals were killed, and consequently there was little or none of that meat for the foxes.

"With the departure of the birds in the fall, the foxes as usual scoured the beach for food and that source proving insufficient, recourse to the seal fields, where formerly they were sure of something when driven to extremities, proved unavailing. The limited amount of seal meat was soon cleaned up. After that, there was nothing for them but starvation, and those that succumbed were quickly devoured by the survivors.

Modern Trapping "Coincident with the regular feeding of foxes, the experiment of catching them in small box traps was made. This was successful from the beginning, as the foxes did not hesitate to enter for the bait, and sometimes two would get in before the trap was sprung, although it was intended only for one. The foxes came in such numbers that at least 50 box traps would be needed to accommodate them. This suggested the erection of a house trap, and accordingly a rough corral or house trap 8 by 14 feet was constructed beside the coal house. Three or four seal carcasses were placed in the trap for bait. The foxes entered with little hesitation and soon 40 or more would be inside. The man operating the trap stood inside the coal house, and by pulling a rope, caused the door to drop, and the foxes were prisoners. Subsequently a wire-mesh trap or cage 14 by 10 by 8 feet was procured and placed at one end of a house especially

for the fox business. This house is divided into three rooms, in the larger of which is a vat for freshening salt meat or fish. The other rooms are designated as trapping and examination rooms, respectively. The cage adjoins the trapping room. All food set out for foxes is placed in the cage, the door being always open. Week after week before trapping begins the foxes feed in this trap, and of course have no fear of it.

"When trapping time arrives, food is placed in the trap as usual and 8 or 10 men repair to the fox house. The door of the wire cage is adjusted and the man who operates it is stationed in the trapping room, in a position to observe what is going on in the cage; and when a sufficient number of foxes have entered, he closes the door by pulling a small rope. He then goes into the cage and drives the animals into the trapping room, where two men with large leather mittens pick the foxes up and pass them, one at a time, into the hands of others waiting in the examination room.

"When foxes are numerous in the trapping room, they run between the legs of the men attempting to catch them, climb up their bodies and jump from their shoulders, but very seldom bite except when they are taken hold of. If they get a good hold of a man's hand they hang on with bull-dog tenacity until their jaws are pried apart. They seem to realize their inability to bite through the mittens, and with few exceptions are easily handled. Major Clark reports one last year as lying inert in the native's arms, making no struggle whatever, and apparently enjoying the smoothing it received.

**Selecting
the Breeders** "The Government Agent is stationed in the examination room, and when a fox is passed in he decides whether it shall be killed, or branded and dismissed as a breeder. The elements on which his decision is based are the colour and quality of the fur, the age, length of brush, and live weight of the animal. All white foxes, runts, those off colour, crippled, bob-tailed, in poor condition physically, suffering from mange, or otherwise unfit to be left as breeders, are dispatched at once. All animals left as breeders must be in good physical condition, of good colour, and either young or in the prime of life; males must weigh at least 10 pounds, and females at least $7\frac{1}{2}$ pounds.

"The age is determined by a dental examination which is made by opening the animal's mouth with a soft gag, and inspecting the teeth.

"In taking the live weight, a strap two inches wide is looped around the animal's tail and the other end of the strap attached to a spring

balance suspended from the ceiling of the room. When the animal becomes quiet the weight is ascertained and entered.

"If the beast is to be left as a breeder, a ring one inch wide is cut in the fur of the tail with a pair of scissors after which it is dropped into a hopper and finds itself out of doors. Males are branded near the end of the tail, females near the rump. About four-fifths of those dismissed as breeders are caught the second time, and some of them are recaptured ten times or more in the course of the season. Recently, Mr. Chichester installed several automatic traps, auxiliary to the regular traps, which have done good work.

"When the animal is to be killed, the man who has it in hand bends the head backwards until the neck is broken. The dead animal is then thrown into the adjoining room, where other men remove the pelt. This is done by running a sharp knife up the inside of the legs, and down the length of the tail, and drawing the pelt off, leaving the fur side in. After the breeding quota is secured, all unbranded foxes entering the trap are killed. All trapping is done at night with light from lanterns. The next day the skins are cleansed and stretched on frames to dry. Later on they are whipped and combed, and, the following summer, barrelled and shipped to London.

"The skins are prime from November 15 to January 15, approximately. About the latter date the fur begins changing colour, and the skin shows signs of 'staginess.'

"As indicated, the animals' ages are ascertained by dental examination. In this work no pretense to absolute accuracy is made. Dental examination of a hundred or more dead foxes of both sexes showed a division of the animals into three classes, which classification has since been followed in making the annual census. These are first, yearling or approximately one year old; second, middle-aged or approximately two years or three years old; third, over three years old. The young and the advanced in life are easily distinguished, but the intervening ages are more difficult to determine. It is doubtful if the life of St. George foxes ordinarily exceeds five years.

Contents of Stomachs

"On examination of 334 stomachs, seal meat formed the entire contents of 64, and the partial contents of 100 others. This meat of course was gotten in traps, and was what the animals came for. The contents of 17 full stomachs varied in weight between 14 and 20 ounces. These animals were still feeding when trapped and how much more they would have eaten if unmolested, cannot be determined. The stomach, when empty, weighs from $1\frac{1}{2}$ to 2 ounces, but its capacity of distention for the reception of food is aston-

ishing. It is doubtful if an animal after gorging with so much meat would feed the next day, but it is known that certain foxes living in the vicinity of the village do come for food daily.

"Grass was found in 88 stomachs, feathers in 57, wild parsnip in 12, fish bones in 8, bird or seal bones in 28, dirt or sand in 22, tunicates in 66, sea eggs in 4, and fox fur in 8. Seven stomachs contained only water, and 14 were empty.

Contents of Intestines "The intestines varied in length from $6\frac{1}{2}$ to 10 feet, no difference being found in this particular between the sexes.

On examination of the intestines of 240 foxes killed in trapping, grass was found in 62, feathers in 20, wild parsnip in 16, tunicates in 5. Neither of these things undergoes any apparent chemical change in the stomach or intestines, and can be identified upon evacuation in the excrement. Those small circular tunicates are swallowed without mastication and passed without digestion. Dirt was found in 24 intestines, gravel in 11, bones in 12, fox fur in 10. Two varieties of intestinal worms were found in the intestines of 26. Specimens sent to Dr. Stiles were identified as species that affect domestic animals, and not particularly harmful. The distribution of the worms was general, all ages and sexes containing them. Excepting lice in the fur, these worms were the only parasites discovered.

Physical Characteristics "The live weights of 198 males left for breeders varied between 10 to 20 pounds each. Of this number 180 weighed between 10 and $13\frac{1}{2}$ pounds.

"The live weights of 225 females varied between $7\frac{1}{2}$ and $11\frac{1}{2}$ pounds. Of this number, 18 weighed less than 8 pounds and 13 over $10\frac{1}{2}$ pounds. Of 180 males killed, 101 weighed 10 pounds and under, while 17 weighed over 13 pounds, the heaviest weighing $19\frac{1}{2}$ pounds.

"Of 86 females killed, 55 weighed 8 pounds and under, and 9 weighed 11 pounds, and over. The heaviest female killed weighed $13\frac{1}{2}$ pounds, the lightest $4\frac{1}{2}$.

"The average length of 180 male skins, after being dried and ready for shipment, was 30 inches plus; average breadth, 11 inches plus; average length of tail, 15 inches plus.

"When the skins of male and female are placed side by side and compared, the fur of the former is generally found to be superior to that of the latter. As a rule, the fur of the two and three year old males is the choice of all.

"Assuming that the sexes are equal in number at birth, the evidence at my command tends to the conclusion that the males are more

vigorous and better able to survive adverse climatic or other conditions than the females.

Breeding "Except for a few cases, mating, according to my observation, is confined to the month of March and the first half of April. The earliest birth of pups noted by me was May 17, the latest June 6. Altogether I have seen 22 litters of new-born foxes. The largest of these consisted of 11, the smallest of 5 members. Three litters contained 1 white each, three, 2 dead each, and six, 1 dead each. These discoveries were made shortly after the young were born and before some of them were dry. In all these cases the mother made no preparation, but gave birth in slight depressions on the surface of the ground. In every case the mother was much concerned by my presence, and immediately transferred her young to some subterranean spot in the neighbourhood. She removed the dead as well as the living. The male consort was not present at any of these births. I am inclined to think the mother always gives birth on the surface of the ground, and within a day or so transfers the young underground for protection and security.

"As a general thing the young are not observed until about the middle of June. They are then of pretty good size and play or feed about the mouths of their burrows, on food brought by their parents. When the young are thus playing or feeding, one and occasionally two old foxes are in the vicinity. These are supposed to be parents when two are present; but generally only one, presumably the mother, is about and the approach of a person causes the emission of a shrill note from her which sends the young scampering under the ground.

"The number of young seen at the mouths of their burrows varies between 1 and 4, according to my observation. Major Glack saw 12 at the mouth of one warren, but he was under the impression that more than one family was represented. During the summer of 1906, Mr. Chichester observed daily for many weeks a family of eleven, all of which were eventually brought up by the mother. I am inclined to consider this litter a very exceptional one. If it were not, we would have a great many more foxes at trapping time.

"The infant mortality, which is very great, takes place shortly after birth and is probably attributable to want of nourishment, cold, and inclement weather. As soon as the young can eat meat, they thrive rapidly and under ordinary conditions reach maturity.

"On one occasion a native found a family of 12 young that had just been born. One he thought was dead and brought it to me, but after being in the house ten minutes the little thing showed signs of

life. It was placed on a hot water bottle, where it soon revived and began to squeal. Mrs. Judge administered milk with a medicine dropper and it soon settled down and went into a healthy sleep. When it awoke, the medicine dropper was again brought into use; and, later on, it learned to nurse one end of a bunch of cotton, the other end of which was immersed in milk. It improved steadily on a milk diet until it was three weeks old. It then grew less ravenous, probably as a result of overfeeding, and, at times, refused to nurse. At the age of four weeks it died. Its eyes opened on the 15th day. When brought in, it weighed 2 1-4 ounces; when three weeks old it weighed six ounces.

**Reduced Number
of White Foxes**

"White foxes are occasionally found in litters of blue. There is no record of a litter of white foxes. As the white skins are of comparatively little value, continued effort to exterminate white foxes has been pursued since 1897. Every white fox entering the trap since that time has been killed at once and, in addition, the natives are permitted to shoot them any time during the winter. The total number killed in 1897 was 40, in 1898 it was 18, and since that time the number killed per year has varied between 6 and 12, with the exception of the winter of 1903-1904, when 15 were killed. Last winter 8 white skins were secured, but Major Clark, who was then in charge of St. George, says that only three of these were pure white, the others being either marred or mottled with faint blue spots. During the summer of 1906 Mr. Chichester observed a number of foxes that were part blue and part white. After September, he saw but one of these and therefore concluded that as winter approached the parti-coloured coats became white.

Diseases

"Evidence of disease among foxes on the island is scanty. Foxes found dead at any season are always autopsied, the local physician assisting, but it is seldom that the cause of death can be definitely ascertained. Dr. Mills and I found a fox in spasms, which on post mortem was found to have been suffering from uremic poisoning. One death was due to hemorrhage of the kidney, and another to tuberculosis. This latter case was found by us on May 28, 1905. The animal was a female, 3 years old, carrying one brand. She was void of fat and weighed not more than 4 pounds. The loss of flesh had occurred since the time of trapping, a few months previous. Tubercular nodules were found in both lungs. Death, on one occasion, resulted from a sack of pus which had formed on the intestine. Another dead fox showed all the organs normal except one of the kidneys, which was atrophied.

"Mr. Chichester reports three dying of kidney disease and one of

tuberculosis in 1906, and one of perforation of the stomach caused by an ulcer in 1907. In that year he killed four that were suffering from mange, and in 1908, Major Clark killed nine that he found afflicted with the same disease.

"An unusual number of dead on St. Paul island the winter of 1902-03, taken in connection with symptoms of mania noticed by Mr. Lembkey, led him to believe that an epidemic of some sort affected the foxes that year.

"When foxes starve to death a dark discharge issues from the anus.

"Statistics of the catches prior to 1840 are not available. For the 19 years ending with 1860 the average annual catch for St. George island was 1,278.

"For the 19 years ending with 1889, according to figures kindly furnished me by the Alaska Commercial Company, the former lessees of the sealing privileges, the average annual yield was 1,074.

"The following table shows concisely the entire trapping since steel traps were abandoned, which is coincident with the inauguration of regular feeding.

BLUE FOXES TRAPPED

	NUMBER OF TRAPPINGS		Killed, inc. white	RELEASED AS BREEDERS		*Total trapped
	Fox house	Elsewhere		Male	Female	
1897-98....	11	1	346	102	324	772
1898-99....	7		386	110	389	885
1899-00....	9		418	65	498	981
1900-01....	24	7	441	204	690	1,335
1901-02....	24	9	246	202	650	1,098
1902-03....	28	21	511	250	250	1,011
1903-04....	28	21	491	284	286	1,061
1904-05....	38	37	272	244	250	766
1905-06....	43	22	481	279	302	1,062
1906-07....	36	31	380	232	270	882
1907-08....			446	267	272	1,005

*Occasionally the column, "total trapped," includes skins of animals found dead.

"During the first three years shown in the above table, the work was under the supervision of the government agents, the next five under that of the company agents, and, since 1906, again under the government agents. The ebb and flow in fox life as shown by the trapping is capable of explanation, but the details cannot here be considered.

Summary "Females were immune from killing during the first six years; since then approximately an equal number of males and females have been released for breeding purposes, and the remainder killed, regardless of sex. It was thought, in the first instance, that, by saving all females and a small number of males, polygamy would become general among the foxes as is the case with domestic animals. Results not meeting with expectations, the scheme of leaving a number of pairs and saving them for breeders was adopted.

"Evidence of promiscuous sexual intercourse among the foxes is confined to a very few cases, none of which appear in the printed reports of the agents of the Department of Commerce and Labor. Only one case has come under my observation. The different method of branding males and females is reported by Mr. Chichester as showing that pairs of foxes often seen playing together in the spring are not always male and female. He also observed a female fox bring up a litter of young alone and unaided. Later on, however, the same gentleman found the first authentic case of paired foxes jointly engaged in feeding and guarding the same litter of young.

"It is possible that some of the females do not mate or become impregnated, and there is evidence that others abort; so, on the whole, it would seem wise to leave a surplus of healthy vigorous females, instead of adhering rigidly to the rules now in vogue.

"At present the business is carried on under a contract, by which the North American Commercial Co. gets all the skins taken, compensates the natives for their labour, and furnishes a certain amount of fox food; but the feeding, trapping and entire conduct of fox affairs is in the hands of the government agents.

"While the regular annual catch of fox skins on St. George island since the present methods were adopted is less than half what it was from 1870 to 1890, as herein shown, it is evident that the herd, and with it the annual catch of skins, can be indefinitely increased. The fact that on St. Paul island, where nothing was done to perpetuate fox life, the species is about extinct, justifies the opinion that the measures taken on St. George island have preserved the foxes thereon. Summing it up, it may be stated that the preservation and increase of the foxes on St. George island depend, primarily, upon the bountiful feeding of proper food for about eight months every year; and, secondarily, upon the careful and methodical selection of the animals reserved for breeding purposes."

RACCOON

(*Procyon lotor*)

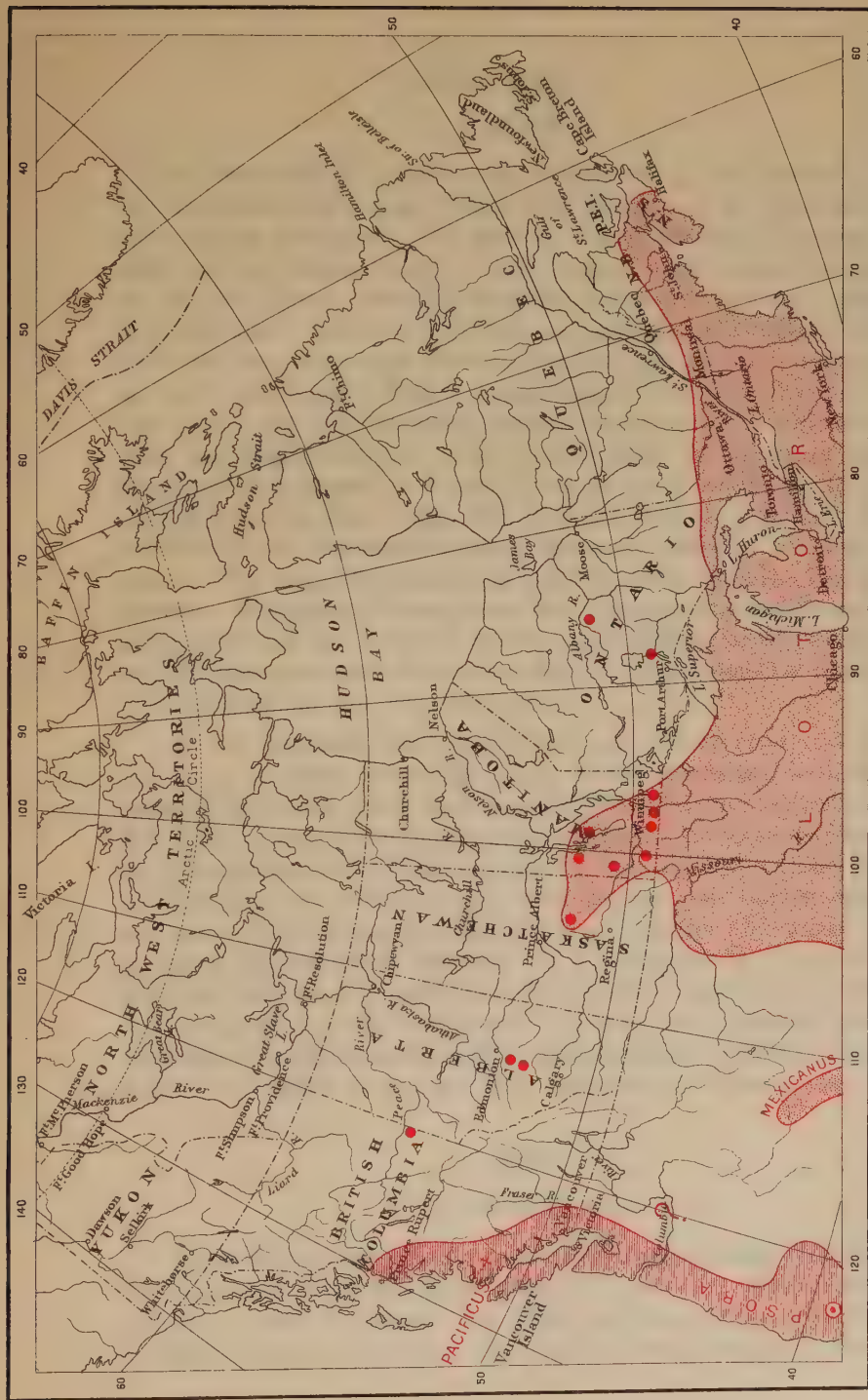
THE raccoon belongs to the *Carnivora* and is closely related to the bears. It weighs from 10 to 25 pounds, is of a brownish-gray colour with black tipped hairs over the back and dark rings on the tail, and, when captured as a cub, is easily tamed. It does not appear to have the fighting characteristics peculiar to the *mustelidae* and, therefore, might possibly be easily kept in a wooded area where numerous dens and hollow trees are found. Its habits are somewhat similar to those of the bear. It hibernates in winter, so that probably mating takes place in the fall, and the young are born about May 1. It will eat meat of all kinds, frogs, corn and vegetables. One breeder said that he had fed his pair almost wholly on wheat shorts supplemented with table scraps.

A heavily-wooded area, several acres in extent, with a creek running through, affords a favourable site for a raccoon ranch. The fence enclosing it should be of No. 14 galvanized woven wire, 2-inch mesh, with a substantially constructed overhang. A sheet of iron around the top of the fence would also help to prevent escape.

Brass estimates the yearly production of pelts at 600,000—all from America. The northern pelts are best and No. 1 large northern are now quoted at \$4.50 each, with prices advancing sharply. Near large cities the flesh also may be sold for fifty cents or more.

If the rich mahogany-coloured raccoons could be secured and bred true to colour, and if present prices were maintained, a profitable industry could probably be built up in northern districts after the necessary experience had been acquired.

The fact that raccoons are found in only a few portions of Canada does not mean that they cannot be successfully raised in more northern regions if food is provided. In general, it is safer to move a fur-bearer from a warmer to a colder home than to reverse the process.



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MAP 2.—RANGE OF THE NORTH AMERICAN RACCOONS IN CANADA

This map is founded chiefly on papers by Messrs. D. G. Elliot, V. Bailey, R. MacFarlane, W. H. Osgood, C. Hart Merriam, John Richardson, R. Kennicott, L. Adams, J. Rowley, J. A. Allen, G. S. Miller, S. F. Baird, E. A. Mearns, and E. T. Seton.

In the north and east the lines are tolerably accurate, but in the Rocky Mountain and Pacific Coast regions, must be modified by future work.

Two species of Raccoon are recognized:

Procyon lotor (Linnaeus), with its 2 races,

Procyon psora Grey, with its 2 races.

WEASEL FAMILY

(*Mustelidae*)

THE weasel family includes the mink, marten, otter, weasel, fisher, wolverene, sea-otter, skunk and badger, all of which are very valuable for their fur. The Russian sable, sea-otter, Hudson Bay sable, ermine, black marten, fisher, Alaska sable, otter and mink, are derived from the animals mentioned above and are among the most expensive furs. Russian sable skins are frequently sold at \$500 or more. Area for area, they cost more than silver fox, as some sable skins are only about eight inches long, exclusive of the five-inch tail. The pelt of the wild sea-otter brings a higher price, on the average, than the wild silver fox. The Hudson Bay, or American marten sometimes has almost as beautiful fur as the Siberian, but the finest pelts sell for less than \$100. The Canadian weasel, or ermine, is usually inferior to the Russian, often having a yellowish white or gray colour. The most expensive mink pelts are those from the Laurentian plateau. The price of fisher skins has recently advanced greatly and prime skins sell for as much as \$75 each. The price of skunk pelts has also advanced and black skins from northern districts now bring from \$4 to \$8 for the finest specimens.

If the domestication of the marten, fisher, otter, mink and skunk, or, in other words, the family of the *mustelidae*, were accomplished, there is no doubt that a market for more than ten million dollars worth of raw fur annually could be found. The annual production of all American pelts is between twenty-five and fifty million dollars, and the above-mentioned family, with the Siberian marten included, would supply a large proportion of the demand for high-priced furs—probably well over fifty per cent. It is worth noting in this connection that the recently established fur-farming experiment stations in the United States will experiment first with this family of animals. They will probably keep the marten and the mink, these two being considered by experts among the most desirable for domestication.

MINK

(*Putorius Vison*)

There are two well-known species which resemble each other closely the European mink or marsh otter of Europe (*P. lutreola*) and the American mink (*P. vison*). The latter is found over a large portion of North America, the finest and darkest being the small minks of

Quebec and the Ungava peninsula. While it lives on the water a large part of its time and makes its home near streams, it can live on the land away from the water and has even been found in trees.

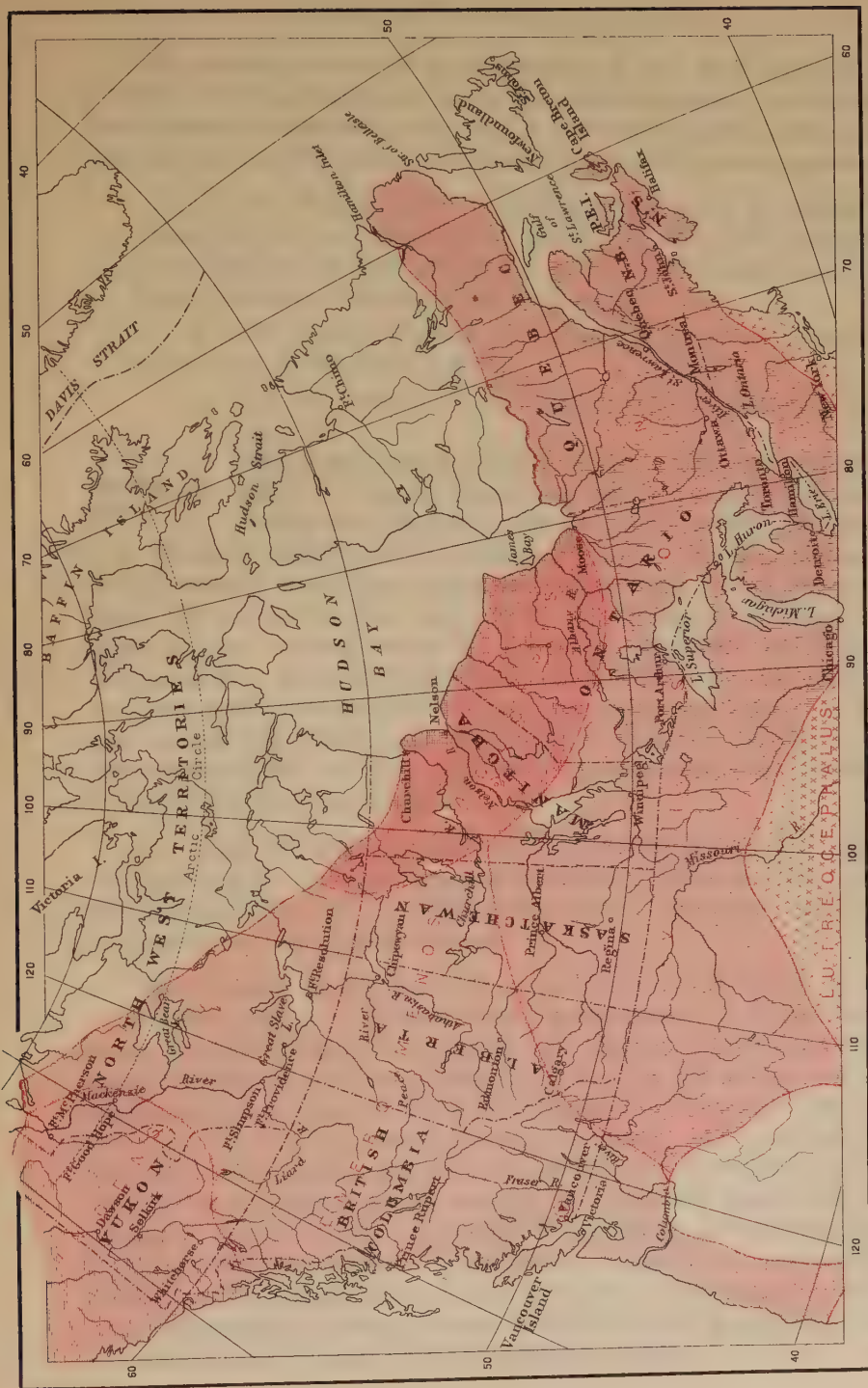
The fur is dense and soft and the overhair is of stiff lustrous water hairs. The darkest colour extends down the back and tail. The dyers usually accentuate the dark colour by brush dying or tipping the fur.

Brass estimates the world's yearly supply as follows: America 600,000 skins; Europe, 20,000; and Asia, 20,000. They do not seem to be decreasing rapidly, but the price is advancing and, owing to the excellent quality and durability of the fur, is likely to remain high. Some fancy ranch skins have been sold for \$13 and good skins will bring about \$10 each. Some conception of the extra value of north-eastern mink can be formed when it is known that Quebec furriers sold their mink to New York in 1911 at \$9 each, and purchased mink of the same quality mixed with best eastern United States skins at \$8 each.

MINK-FARMING

The farming of the mink is still in the experimental stage and no ranches examined, except perhaps two, would justify detailed descriptions as models to copy from. It has been demonstrated that mink can be kept in captivity and its young reared successfully. As for the quality of pelt, only a few statements could be secured. All attempts to rear this animal in Canada are too recent, or else were made over thirty years ago when mink was high-priced, and accurate records were not kept. The statements of sales of skins received were highly satisfactory, and indicate that pelts from stock bred in ranches is, under certain conditions, better than the wild stock. It was also demonstrated that rapid improvement in the stock is possible because of the opportunity for selection of sires—an opportunity not possible in fox rearing at the present time because of the latter animal's monogamous habits. Thus, one male out of every four or five can be chosen for his size, beauty of colour or quiet disposition, and a rapid improvement towards a good stock made.

There have been hundreds of mink ranches in America and there are probably about fifty in Canada at the present time. None of them are very pretentious except, possibly, that of La Compagnie Zootechnique de Labelle, Ltd., the head office of which is in Montreal and the ranch at Lac Chaud, in the Laurentian highlands of Quebec. The capital of the company is \$49,000. As soon as the success of mink-ranching is assured, it is proposed to proceed with the breeding of the otter along similar lines.



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MAP 3.—RANGE OF THE NORTH AMERICAN MINKS IN CANADA

The map is founded chiefly on records by J. Richardson, Audubon and Bachman, R. Kennicott, E. W. Nelson, J. Fannin, C. H. Townsend, C. Hart Merriam, O. Bangs, W. H. Osgood, E. A. Preble, S. N. Rhoads, D. G. Elliot, V. Bailey.

The following are recognized:
Putorius vison (Brisson) with 5 races.

The whole question of mink-ranching is one that needs more thorough investigation and probably the establishment of experimental farms under experienced ranchmen. A somewhat vague classification into three types of farming can be made from the information gathered:

1. The Natural Plan.—The minks are given an extensive range and the conditions under which they live differ from the natural conditions only in that the animals are fed and occasional nests provided. All catching is by trapping.
2. The Colony Method.—The families are kept in colony houses with a runway to a creek.
3. The Pen System.—Each mink is kept in a separate pen.

The Natural Plan

The Compagnie Zootechnique de Labelle was the only ranch of this type examined, though a vague report was obtained of another of the same type at Port Medway, N.S. In 1911, some two dozen mink were placed in the area shown in the illustration, comprising about one-quarter acre. They increased about 100 per cent. in number in 1912. The manager explained the small increase as being due to the limited quarters with which they were provided. Another possible explanation is that 1912 appeared to be a poor year for both mink and fox. It is also possible that the old wild animals captured did not take kindly to their new location or to the artificial nests. The last cause will disappear, particularly as soon as ranch-bred mink are available.

As stated, the total area enclosed in the ranch in 1911 was about one-quarter acre. In 1912, work was under way to enclose an area 2,000 feet long and 1,500 feet wide at the widest point. The larger range will probably insure considerable success.

The situation of the ranch is on an island in Lac Chaud in an uninhabited section of country in the Laurentians. It is high and rocky and covered with birch and spruce. The ranch is enclosed with one continuous fence about 12 feet high, set on solid rock on land, and on sunken piers in the water. The chief difficulty is in the construction of the water fence as ice breaks the wire in spring. It is proposed to prevent this by dropping a plank fence three feet wide into the piers to protect the wire during the icy season. In spring the planks will be removed. Not more than a dozen feet of the margin of Lac Chaud are included within the fence. To prevent the escape of the mink under the fence, a wide carpet wire is turned in on the lake bottom. To prevent high climbing, a strip of sheet iron a foot wide is fastened half way up the fence. There is also an overhang of iron.

Nest of the Female The nests are made about 20 inches by 20 inches and 6 inches high, and are pushed into a large box (similarly to a drawer in a chest of drawers), which is placed in a bank of earth and covered up. Thus, if it is necessary to examine the nest, it may be drawn out. A piece of meshed wire over the inner box will permit a view of the whole interior. The entrances should be a foot or more long and from three to four inches in diameter. Mr. Desormeau, the manager at Lac Chaud, reported that, once a female took possession of a nest, no other mink was allowed to enter, always being met at the entrance to the passageway and beaten back. The food is always carried to the entrance and is taken from the hand as quickly as offered. As many nests as there are females in the ranch, and probably a few more, are required to prevent fighting for possession or the making of nests in burrows.

Home of the Male The males are provided with large caves roofed over with planks or concrete. Food is thrown in through a hatch in the roof. In summer the mink obtains a considerable quantity of food in the water, as small fish can get through the meshed fence. Because of the free range, only flesh food is fed.

It could not be ascertained how the mother and young are cared for during the several months when the latter are dependent on their mother for food and protection. It is the intention of Mr. Desormeau to separate the young from the old each year and place them in one end of his fenced area, having a fence crossing the island to divide them. It is likely that when they are about two months old, or about July 1, the separation of the young from the mother could be easily effected by simply carrying them away in their box. They would be old enough at that time to live on solid food and would be tamer and gentler than if left with their mother.

The food is almost wholly fish, supplied from the lake. Permission has been received from the Quebec authorities to capture the fish by any method. It is proposed to restock the lake with fry.

It is estimated that six men can manage the ranch and that about two thousand females and one quarter as many males can be accommodated as breeding stock.

The Colony Plan No ranches of this type were examined, but proof that such exist was furnished by owners who did not wish to reveal to the public the methods they used. The promoters of this method claim to be highly successful and have given considerable study to the habits of the mink, a fact which is proved by their intelligent discussions of mink-ranching problems.



MINK RANCH AT LAC CHAUD, ONE QUARTER OF AN ACRE IN AREA



MINK'S DEN, ARTIFICIAL

They say that the chief difficulties are in securing the first litter from the wild animals and in getting suitable food. The wild mink is usually wholly unsusceptible to domestication or even semi-domestication. They frequently kill themselves by hanging, cutting their throats, or beating their heads against a wall. Most of them will commit suicide or die of fear on the near approach of a dog. These facts have been corroborated in the experience of 1912, a large proportion of wild foxes having died while being shipped and a large number of those caught for ranching purposes being found dead, sometimes badly cut or lacerated.

If the young are taken from the mother as early as possible—say six weeks or seven weeks old, in Eastern Canada about June 15—they become very tame and, according to the advocates of this new method of ranching, can be reared in family colonies afterwards. A colony house, or large box, can be provided and a considerable runway or paddock may extend in front to include a portion of a stream.

The food is English sparrows, frogs, meat, fish, bread and milk. The young are fed new milk. An English sparrow each day is the proper amount of food. As they are promiscuous in mating, the majority of the males may be slaughtered and only the finest kept.

The Single Pen System

The method of ranching mink which has been used almost exclusively in America is one which employs a small pen for each animal and supplies the water in troughs to each pen. The two largest establishments visited consisted of an ordinary barn about 20 feet wide and 30 feet long. The walls were open under the eaves to make the interior as airy as possible. On either side of a central alley were pens about 4 feet wide and 8 feet long, provided with a nest box on a slight elevation, and having a crooked passage for entrance. Water ran through troughs at the ends of the pen, or was pumped in daily. The partitions were of wire above and boards near the floor. If wire is used for the walls, an overhang is necessary to prevent climbing out, or the wire might be made to extend over the pens completely. Very little light is required, as the mink usually sleeps during the day.

Mink can be reared in such pens, but there are grave doubts of the permanency of the good health of the animals. In a Nova Scotia ranch there was no difficulty in rearing an average of three and a half to a litter. The young minks had litters of from two to four and the older breeders sometimes had six. With such satisfactory results, when every pair raised could be sold for \$40 and food could be procured freely, it is inconceivable why development of the business did not proceed. The managers were continually selling off their stock

and capturing more wild ones. They also admitted that they would not again use board floors for mink, but would have pens enclosing a larger area of ground. From these facts, it may readily be concluded that there were considerable difficulties of some kind.

The mink appears to thrive on any kind of food that a cat would thrive on. At the Centreville ranch, fish and fish offal were the principal diet, and were fed in large quantities, though, as stated below, no more than they will eat should be fed to them. Milk, eggs, bread, fish and meat are staples. The English sparrow is a great favourite for mink food and frogs and live eels are also fed. A mink will frequently eat food with avidity when it is thrown into the water, whereas it might refuse to eat it if placed in its feeding trough.

**Proper Site
for Pens** A study of the literature available leads to the conclusion that it will be possible to rear mink in secluded wooded areas on the banks of a stream or pond. The method adopted at Lac Chaud is sure to be, at least, partially successful and may prove to be profitable. The cost of building a mink-proof fence in the water is high, compared with the cost of building on land. For this reason a site on an island is not considered as good as a site on a pond; for the whole pond or lake can be enclosed with a land fence. Thus a small lake, a dam, or a stream can be utilized for a ranch of any of the above-mentioned types. A shed could be built on the banks of a stream and the pens extended outside the walls of the building across the stream. The pens need not be wider than 3 or 4 feet nor longer than 5 or 6 feet inside the building, but should be twice as long outside. To prevent burrowing the outside walls should be sunk in the ground about 18 inches, except where in the water. If the natural method of ranching is used, two water areas would be necessary to provide two fenced areas.

It is advisable to double fence a mink ranch, similarly to a fox ranch, in order to prevent their escape and to keep off intruders, especially dogs and other wild animals, the smell or sight of which seems to inspire the mink with great fear.

In the natural method of ranching, the sexes seek each other out, but, when one animal is placed in each pen, the keeper has to be very watchful during the latter part of February and up to the middle of March. The male mink can be admitted through chutes and has to be withdrawn at once if the two begin to quarrel. If no quarreling occurs, the male is not withdrawn for two days. Mating usually takes place within two weeks, and constant watchfulness has to be exercised to prevent fights when the male is admitted at the wrong time.

In one case the canine teeth of a vicious male were cut off and he became quite docile. Mink may be safely handled if two pairs of woolen mitts are worn.

The period of gestation is about six weeks. The tiny young, which are blind for about five weeks, should not be handled. Before they are six weeks old, the mother leads them out and they begin eating solid food. At six or seven weeks of age they should be taken from the mother, unless she is of a very quiet and gentle temperament. Most of them will become quite tame.

The following practical hints on mink-farming have been recently published in circular form by the Biological Survey of the United States Department of Agriculture:

(1) Minks should be kept in the proportion of one male to five or six females.

(2) Each breeding female should have a separate pen. The male should be kept by himself except at mating time. The females begin to rut about the middle of February. The male should be admitted to the female for about one day. The young are born about the middle of April.

(3) The females must be kept alone or they will be likely to kill each other's young. The male would also kill them if he had an opportunity.

(4) *Food:* The best steady food for minks is bread and sweet milk, corn-mush and milk, or corn-mush cooked with bits of meat in it. The animals should have meat or fish about twice a week. The meat may be a very cheap kind. Keep pans clean and feed only as much as the milk will eat up clean at each feeding. Feed once a day, except females that are suckling young. These should be fed twice. Provide fresh water regularly. Do not salt the food.

(5) *Pens:* Pens should be 5 or 6 feet square, the sides of smooth wide boards cut 4 feet long and set up with the lower end resting on a footing of stone or concrete 18 inches in the ground. The floor of the pen should be the bare ground. The pens can be built economically in groups of four or more. The sides can be of heavy wire netting instead of boards, but in that case the top would need to be netted or the animals would climb out.

(6) *Boxes:* Boxes about 2 feet by 1½ feet by 1½ feet in size should be provided for nests. They should have hinged lids so as to allow their being opened and examined. Fine straw or hay should be

provided. The boxes may be outside the pens, bolted to the fence; a hole in the fence and box admits the animals, the box to be 3 or 4 inches above the ground. The boxes should be as dark as possible, with a hole 4 inches in diameter for the entrance of the minks.

MARTEN OR AMERICAN SABLE

(*Mustela Americana*)

No marten farms were found in the course of this investigation, although ranchmen were attempting to secure specimens. In the autumn of 1912, one Nova Scotia farm obtained six pairs from Labrador and probably a few more farms in Ontario are stocked.

The experience of only one person in breeding marten was obtainable, that of A. H. Cocks, of Henley-on-Thames, England,* Mr. Cocks, who has raised five litters of marten in captivity, states that the principal difficulty is to ascertain when the female is in season. If a pair are put together when the female is not in season, it is very apt to end in the death of the female from a sudden snap through her brain by the male.

Habits of the Marten The marten is one of the most blood-thirsty of animals, being inferior only to the weasel and, possibly the fisher, in this respect. It mates promiscuously like the rest of the weasel family and, because of its savage nature, two cannot be put into one pen. The pens should be similar to the mink pens, of No. 17 of No. 18 one-inch mesh wire, but higher and wired all over. The ground may be covered with wire to prevent burrowing or the fence may be sunk into the ground a foot deep. Trees and brush may be placed in the pen, or the pen placed in the woods. They are accustomed to an exceedingly active life in the trees and must have an opportunity provided for exercise or they will not remain long in breeding condition. The nest should be about the size of that advised for the mink, or, possibly, slightly larger.

Mating The difficulty with the marten, as with the mink, comes at mating time; only it is much harder to control the difficulties in the marten's case, as mating takes place at night, whereas minks mate at any time. The placing of crossed straws about the pens by the female gives the keeper his clue to the time for the admittance of the male. He should be left in several days. For safety's sake, in

*An account of his experiences has been published in *The Zoologist* for 1883, p. 203; and in the *Proceedings of the Zoological Society of London* for 1900, p. 836. Further notes on the young of the species are to be found in *The Zoologist*, 1881, 1897. etc.



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MAP 4.—RANGE OF THE AMERICAN MARTENS IN CANADA

This map is founded chiefly on records by J. Richardson, J. Bachman, S. F. Baird, R. MacFarlane, E. W. Nelson, R. Bell, H. C. Yarrow, A. P. Low, C. Hart Merriam, O. Bangs, E. A. Preble, J. Macoun, W. H. Osgood, C. B. Bagster, D. G. Elliot, J. Fannin, J. D. Figgins, E. T. Seton, S. N. Rhoads, A. E. Verrill, and E. R. Warren.

The following are recognized:

Mustela americana Turton, with its 5 races,
Mustela arctica Bangs. The Newfoundland species.
Mustela caurina Merriam, in 2 races, *caurina* and *origines*.

order to obtain a ranch-bred litter, it would be advisable to cut off the canine teeth of the male. This can be done with an apple stemmer, dentist's forceps, or even an ordinary pair of pincers. The litter of ranch-bred marten, if removed from the mother when about two months old, will be much tamer. The marten was domesticated by the ancient Romans and used for the same purposes as a ferret.

Mating takes place in January or February. The period of gestation is a little more than three months. The young are seen outside the nest when about eight weeks of age. They are full grown at six months and breed when a year old. The number of young in a litter ranges from one to five.

Directions for feeding are the same as for the mink. One meal a day is sufficient for either in order to keep them in good breeding condition.

Marten should be transported in metal-lined boxes, because they will eat their way through a sound inch board. If the Hudson Bay marten can be bred as a domestic animal, there will be no difficulty in finding a market for the skins. At the present time, Asia produces 75,000 sable skins annually, and North American 120,000. The experience of rearing the Hudson Bay marten would probably lead to the domestication of the Siberian marten or Russian sable, which is a smaller animal, but whose fur is much more valuable. As the fur would be more generally favoured and fashionable, besides being more durable, there can be no doubt that the total trade possible in marten skins would be as great as in all kinds of fox skins combined.

FISHER, PEKAN, OR PENNANT MARTEN

(*Mustella Pennanti*)

Only two ranches were found in which the fisher, or pekan, or Pennant marten, was kept. The experiments at one of these appeared to be quite successful as far as conducted, the animals being quite tractable and in good condition. The owners are confident of final success, but no young have yet been produced.

The fisher is about two feet long and has a large bushy tail. At first sight, it resembles a black cat, and hence has received that name locally. It is the swiftest and fiercest of the weasel family and can catch a marten in an open chase, jumping from limbs even 30 or 40 feet high to the ground. When it is known that the marten can catch the squirrel, the significance of this feat can be appreciated.

Ranching methods should be the same as for marten, but on a scale of twice the dimensions. Mating takes place about March 1. Young, numbering from one to five, are born about May 1. It is believed by

many that they pair in the wild state, but it is probable that one male will serve for several females in ranches.

The rapidly rising prices of fisher pelts make the possibility of rearing this valuable fur-bearer the more interesting. A first-class skin can now (1912) be sold for \$75 or even \$100.

CANADIAN OTTER

(*Lutra Canadensis*)

The otter is very easily tamed and may even be given the run of the premises without deserting its owner. The natural method of ranching described for mink, where a whole pond is enclosed and kept stocked with fish, would certainly succeed with otter, especially if arrangements were made to care for the female and the young.

About the time the young are expected, the mother could be caught in a box-trap with a meshed-wire bottom and examined. If she is found to be about to give birth to young, she could be placed in a pen similar to that used for mink, and the young reared successfully. The quiet disposition of the otter and skunk will allow of such treatment. No otter ranches were examined, but the docility and good health of those kept in zoological gardens make it quite evident that it will be 'easy to rear them when we only know how'.

Though the otter is found almost everywhere, the Canadian otter is most valuable. Prime skins now (1912) bring up to \$30 or even \$40. The *Fur Trade Review* for January, 1913, quotes No. 1 otter from Nova Scotia and Labrador, if of dark colour, at \$20 to \$25.

A large, easily available supply of fish is necessary for success with these animals if profits are to be made at the above-mentioned prices. As there is undoubtedly a strong demand for live animals for parks and for foundation stock for ranches, the breeding of otter can probably be prosecuted with profit.

The following article on the otter, by Vernon Bailey, was published in the report of the American Breeders' Association, Vol. 5:

THE OTTER AS A FUR BEARER

"Next to silver and blue foxes, otters seem to promise the best results in fur-farming. They combine coats of real and permanent value with habits easily controlled and well adapted to domestication. They have cheerful dispositions, are playful, affectionate, and intelligent, and though in their wild state great wanderers, they are contented and thrive when confined in every limited quarters. Under ordinary conditions they do not breed in captivity, but it is believed that this

failing can be overcome by giving them sufficiently normal conditions. In their wild state they are in no danger of extermination. Man is their only enemy worth considering and owing to their wandering habits and keen intelligence, they have little to fear from any but the most experienced trapper. They have held their own over thickly settled parts of the United States better than any other animal of equal fur value. They still inhabit most of their original range over the country, never in abundance, but scattered one or two in a stream or lake. They are apparently as common around the suburbs of Washington and in settled sections generally, as in most of the wilder but more trapped forest areas of the country.

**General
Characteristics**

“Full-grown Canadian otters are about 4 feet in total length and weigh approximately 20 to 30 pounds. Their striking characteristics are long, lithe bodies, tapering into long, muscular, flattened tails; very short legs, fully webbed hind feet; short ears, keen little eyes and a beautiful coat of dense, dark brown fur. They are weasel-like in their quickness, extremely muscular and for their size fearless and savage fighters.

**Distribution
and Variation**

“Many kinds of otters occur in different parts of the world, but the largest and most valuable for fur are those of North America, *Lutra canadensis*, and its several closely related subspecies or geographic varieties. Considering their wide range from Labrador to Alaska and from near the Arctic coast to Florida and Arizona, they show surprisingly little variation in size or in colour or quality of fur. This is, of course, owing to their aquatic habits and to the nearly uniform temperature of water in winter over almost the whole continent. The average lower price of southern otter skins may be due largely to the fact that most are caught before the midwinter cold has brought them up to prime condition. It seems not improbable that with dark otters from eastern Canada to breed from, a high-grade of fur might be produced over most of the southern states where no other high-priced fur could be successfully raised. The abundance of fish and crustaceans in many of the southern streams would be a distinct advantage in the way of food supply, and ideal situations for otter farms could be found on hundreds of streams where a few of the animals now live in the wild state.

“For breeding purposes otters with the most valuable coats should be selected, preferably the very dark individuals from eastern Canada, Labrador, Newfoundland or Maine. Considerable individual variation is shown and the grade of fur could doubtless be steadily improved by selective breeding. The largest individuals are from Alaska

and the Northwest, but the skins of these are less valuable than those of the smaller and darker animals of the Northeast. The highest quotations are always for skins from Canada and the Eastern United States.

"The *Fur Trade Review* for December, 1908, and January, 1909, quotes No. 1 otter skins as follows:

Canada and eastern.....	\$18 to \$20
Northwestern and Pacific coast.....	\$12 to \$14
Western and southwestern.....	\$10 to \$12
Western Pennsylvania and West Virginia.....	\$10 to \$12

"Otter fur in the north is at its best in December, but keeps in prime condition until March. In the southern states it probably does not reach its best condition before January.

**General
Habits**

"The prime requisite for success in raising any fur-bearing animals is a thorough knowledge of their habits, especially breeding and food habits. The following notes are offered as suggestions in conducting experiments with otters:

"Otters are semi-aquatic, are powerful and rapid swimmers, able to stay under water for a considerable time in pursuit of prey or in escaping from enemies, but they are also well adapted to dry land. They make long journeys overland from one stream to another and especially delight in travelling over soft snow, on which they run and slide on their silky bellies with apparent enjoyment. On freshly fallen or wet snow they often prefer this method of travelling and will follow the banks of a stream for miles; but the greater part of their travelling is in the water where most of their food is procured. The long flattened tail is a powerful propeller and the large webbed hind feet give additional paddle surface for easy and rapid progress through the water. While on dry land, their motions are comparatively slow and awkward; in the water, they are rapid, lithe and seal-like, almost as easy and graceful and even more rapid than those of many fish. Fish are pursued and caught, apparently in fair chase and with great ease, though it is perhaps not safe to say that all kinds are an easy prey. Otters seem to be about equally active night or day, but most so in the morning and evening hours.

**Food
Habits**

"Live fish, caught in the water and eaten on the banks or on the ice seem to be the favourite food for otters, though it is doubtful if they are more extensively eaten than crayfish. Otter sign is more often composed largely of fish scales and bones and crustacean shells than of any other food remains; but frogs, water fowl,



MINK SITTING ON HIS HOUSE, THE COVER OF WHICH HAS BEEN REMOVED



OTTER

and small mammals or any fresh meats are eagerly eaten. Otters will soon clear a pond or stream of muskrats, especially in winter when under the ice they readily enter the houses and bank burrows. In confinement they are usually fed on fish and fresh meat, about two pounds each per day as an ordinary allowance. This is usually thrown into the water and the animals seem to enjoy fishing it out.

"To raise otters at a profit, a locality should be selected where an abundant supply of fish can be procured at small cost.

**Breeding
Habits**

"Otters are polygamous and during the early spring months, the males travel widely in search of mates, apparently remaining with each female no longer than the nuptial period requires. They are soon off in search of new mates and circumstantial evidence indicates that a male is successively paired with as many females as he can find in condition to accept his attentions during the season. The female finds or makes her den alone in burrows or hollow banks, and raises, guards and feeds her family until the young are large enough to hunt and fight for themselves. They follow her until nearly full grown, but by the time the first snow and ice have come, they have usually scattered and each is living a mainly solitary life. However often their paths may cross or friendly visits may occur, their hunting grounds are selected so far as possible on different streams or lakes; their wanderings are apparently determined by scarcity or abundance of food, and they have no definite home. In confinement they are usually not unfriendly. Two females in a small enclosure in the National Zoological Park have been on good terms for eight years, but a male put in the inclosure with them some years ago was soon killed. For the past 18 months another female and a large male have been in the pen with them and while the three females are usually romping and playing together in the best spirits, one or all often pounce on the male and bite him savagely. Although much larger than any of the females he merely defends himself as best he can and backs away, refusing to either fight or run. It is evident that the males should be kept separate from the females except during the mating season, and it would almost certainly be necessary to isolate the females before the young were born and until they were well grown.

"The number of young in a litter is usually given as two or three, but there are also records indicating four or five, and it seems probable that the smaller numbers are those of the first year of breeding. Data are extremely meagre on this point; but a number of records of families of five or six otters seen together in summer would indicate four or five young, while the uniform number of five mammae of the females would further indicate four as the normal number.

"Whether females breed when a year old remains to be tested, but it seems probable that they do.

"The fact that otters do not breed in zoological parks, where kept on exhibition and under constant excitement and nervous strain, is not surprising and probably does not mean that under more normal conditions they would fail to reproduce at their usual rate.

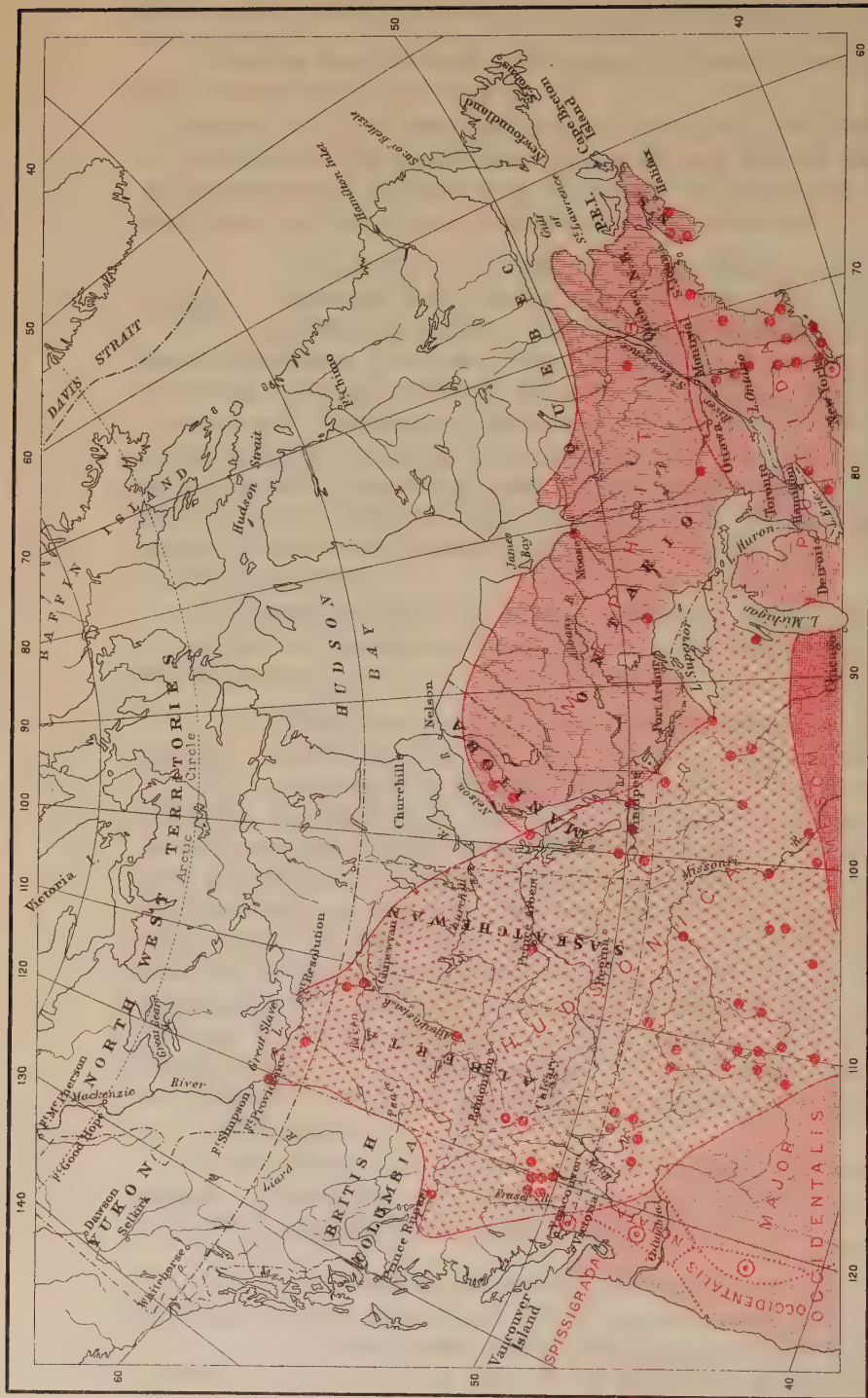
Suitable Location "A large spring or section of a small stream, preferably in the woods, should be selected for an otter yard. A pool at least six feet deep and 20 or 30 feet across should be formed. Steep banks down which the otter can slide into the water are an advantage in furnishing exercise as are also a few old logs reaching into the water. If the banks are firm and stony the otter will be less inclined to burrow, and clear, cold, running water tends to keep them in good health. A series of yards along a suitable stream could be separated economically into family enclosures with inexpensive partition fences. A yard 50 feet square is ample for a family of otters if plenty of food is provided.

"Small houses, hollow logs, shallow caves or artificial burrows should be provided for sleeping quarters where a cool, dark retreat can be had at any time.

Fencing "Otter yards should be inclosed with a fence four feet high, made of heavy woven wire of one-inch mesh and with a 16-inch curved tin overhang on the inside. The fence should be carried on iron uprights four feet apart, curved in at the top for the tin overhang. These iron uprights should be set in a stone or concrete wall, laid one foot deep in the ground and carried across the stream as dams above and below the otter pool. In place of the wall an additional foot of the woven wire can be bedded in the ground, but this will have to be renewed every few years as it rusts out. In the National Zoological Park a welded wire fence with rectangular mesh one inch wide and four inches high, of No. 11 wire is used. This is not easily climbed and is very strong and secure. The iron uprights are double straps one inch wide by $\frac{1}{4}$ inch thick, one on each side of the netting and riveted together.

"Otters do not dig extensively and are not inclined to burrow under a fence. They do not usually climb trees, but can climb up a rough barked or leaning tree to above the top of a fence.

Conclusions "It seems highly probable that, under favourable conditions otter can be raised for fur at a profit, and that, in course of time, a breed can be established combining in the same animals quiet and domestic dispositions with fur of great beauty and



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MAP 5.—RANGE OF THE LARGE SKUNKS OF THE GENUS MEPHITIS IN CANADA

This map is founded chiefly on A. H. Howell's revision, N. A. Fauna No. 20, 1901. Spotted on it are all the records he gives for the species found in Canada, except *occidentalis* which barely enters British Columbia. Additional records by E. A. Peble, J. Alden Loring, and E. T. Seton are marked.

- Mephitis mephitis* (Shaw) with 2 races,
- Mephitis hudsonica* (Rich.),
- Mephitis putida* Boitard,
- Mephitis mesomelas* Licht., with 3 races,
- Mephitis occidentalis* Baird, with 4 races.

value. But the actual test has yet to be made and carried over a term of several years before a decision can be reached as to the degree of success and the profit to be expected. Many facts of vital importance, such as methods of insuring breeding, the rate and dates of breeding, the most satisfactory and economical food supply, improvement of fur by selection of breeders, and age and date when fur reaches its greatest perfection, remain to be worked out. If the necessary experiments can be carried to a successful conclusion, a valuable industry will be added to our national resources."

SKUNK

(*Mephitis*)

No skunk-farms that were examined could be regarded as commercial ventures, but two or three ranches purposed to build larger pens when the animals increased in numbers sufficiently. The increase in all cases examined was an average of five young for each female kept. One male was kept for each half dozen females.

The question always asked when skunk-farming is mentioned, is concerning the difficulty of conducting such a business in any reputable neighbourhood on account of scenting. Contrary to popular expectation the skunk appears to be least objectionable of all ranched animals, the fox being the most objectionable. One might pass alongside a hundred skunks and not observe any odour. They can be easily handled as the accompanying photograph shows. While they may be deodorized by cutting into the scent glands when they are about ten days old, the operation is an unnecessary one, and may be even harmful to the animal.

Skunks are graded according to the proportion of white hair on the skin; as No. 1 with no stripes or very short ones; No. 2, with longer stripes, and No. 3 when the stripes extend the full length of the body. The white part is cut off the pelts and only the black fur is used so that there is a larger area of good fur on No. 1 pelts than on the whiter ones.

It is probable that the rapidly advancing prices of skunk in 1912 will give an impetus to the skunk-raising industry. No. 1 northern skunk brings \$4.25 at present and, if this price continues, there is a large profit to be made in skunk-farming.

Skunks can be kept in captivity under conditions similar to those recommended for mink. On account, however, of the lower value of the pelts and the less vicious and even harmless nature of the animal, it is better to allow them a large run together. The males will not injure the females, but the females will kill the males after mating if they are kept enclosed with them. The females might be kept in pens,

after mating and while rearing the young. A wide range is necessary in order to permit of their securing a variety of natural food.

The methods used in skunk-raising are completely outlined in the following extracts from letters written to the *Hunter-Trader-Trap-per Magazine* by Mr. Brae:

SKUNK-RAISING

"Skunk-raising is a failure if on a small scale, while on a large scale it would be a paying business, giving from 50 to 100 per cent. profit. I will give you my experience on a small scale. The first season I had 12 females and 3 males, all black; the average litter of young was from 3 to 6; the average grade, about 85 per cent. black, the balance being Nos. 2, 3 and 4.

"Naturally, skunks live in holes in the ground, rocks, trees, stumps, etc. Their food consists of mice, birds, bugs, crickets, grasshoppers, bees, wasps, yellow jackets, angle worms, seeds, berries, ground roots and bark. My pen was 14 feet by 36 feet, and 4 feet high with $\frac{1}{2}$ -inch mesh wire floor and 1-inch mesh wire top and covering. I had a number of boxes for harbours. My pen is secure against escape but entirely too small for the purpose intended.

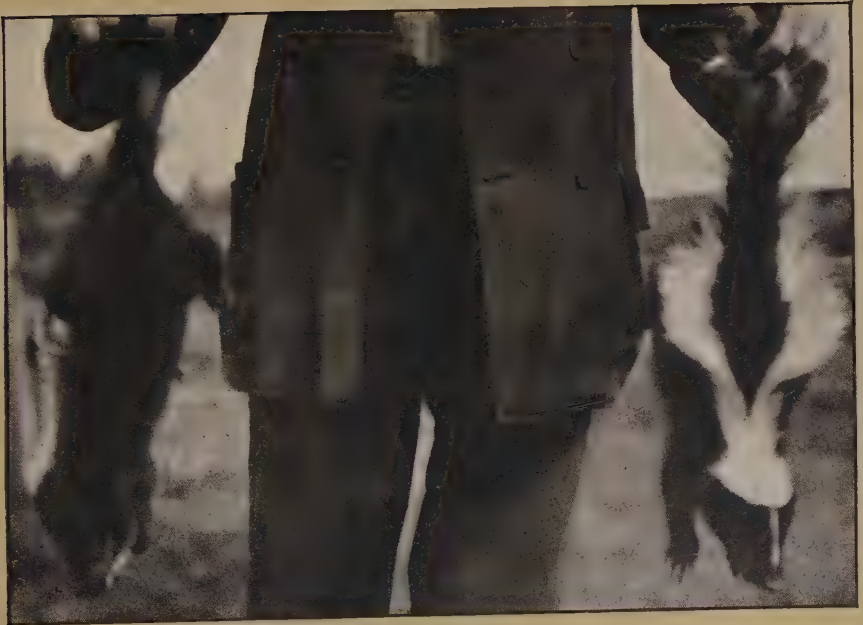
"In the first place, I wish to discuss the disadvantages of starting on a small scale. Having a large number in a small place, will cause them to crowd and fight and kill one another, while to have a separate pen for each female is expensive. After the rutting season the female will kill the male, apparently to protect her young. Skunks are liable to a fatal disease, similar to sore throat or diphtheria. I have known females that had no young ones to take the young of other mothers to their boxes and fight the real mothers away until the kidnapped young starved to death. Others that had young would steal the young of two or three others and then, having more than they could care for, some would starve.

"Another disadvantage in a small enclosure is this, that they get so tame they come out in the daytime to feed and the exposure to sunlight fades the fur to a certain extent. As it is also almost impossible to supply a lot of skunks with the kind of food they get in the wild state, it becomes necessary to substitute some other kind of food, such as dead horses, cows, chickens, corn and various other things which a man with a small lot cannot always have. If not fed properly they become cannibalistic.

"Like every other business, skunk-raising requires capital; and with some one who has capital, together with the experience and practical knowledge, I venture to say there is 50 to 100 per cent. profit



BEAVER



LIVE SKUNKS—LONG-STRIPED

in the business. To make a success, a man should have at least \$2,500 to start with. At least one acre of ground should be enclosed with a 3-foot concrete wall in the ground, and about a 6-foot board fence on top. This would probably cost \$1,500. One should then secure at least 100 females and 25 males. These would probably cost \$300. The remaining \$700 would be needed to pay for feed and for a man to take care of them.

"The necessary attention would be to feed and water them and, in the season of maternity, to see that the females do not steal one another's young and crowd one another in the boxes. The males and females should, of course, be separated. With good care 90 per cent. of the young should be raised.

"Thirty years ago black skunk pelts sold at from 50 to 75 cents. To-day they are one of the leading furs on the market, although they are not known by their own names, but by various assumed ones. At the present time, it is profitable to raise skunks for their fur. The demand is now greater than the supply and is increasing because of the heaviness of the fur, its fine texture, its good wearing qualities and strength. On the other hand, the supply is decreasing for various reasons. The large forest and prairie fires, devastating large sections so that neither bud, snake, nor fur-bearing animal can exist, and the high price which spurs every hunter and trapper to his utmost effort, are the principal reasons. Then coon hunters coming from the city with a pack of hounds to hunt for sport, destroy a good many. In fact, they usually get one coon and kill six or eight skunks. You can follow their trail by the smell and the dead bodies of skunks which they have wantonly destroyed.

"Skunks can be raised as easily as house cats, provided you have an enclosure where they cannot dig out or climb over. For every hundred mature skunks, you should have an acre of ground enclosed.

"I experimented for three years on a small scale. The first year I had one male and three females. They brought forth fifteen young. One of the young ones died, leaving eighteen—eleven females and seven males. Five of the young graded as No. 2, the balance star black.

"The second year I started with twelve females and two males, which brought forth forty-three young. Three of the young ones died, so I had fifty-four in all—fourteen old ones and forty young ones. I disposed of seventeen males and five No. 2 females, leaving a balance of thirty-two black ones.

"The third year the females had from three to six young. Unfortunately, I could not attend them myself and had to entrust them to a man who had no interest in them except the pay he received from me

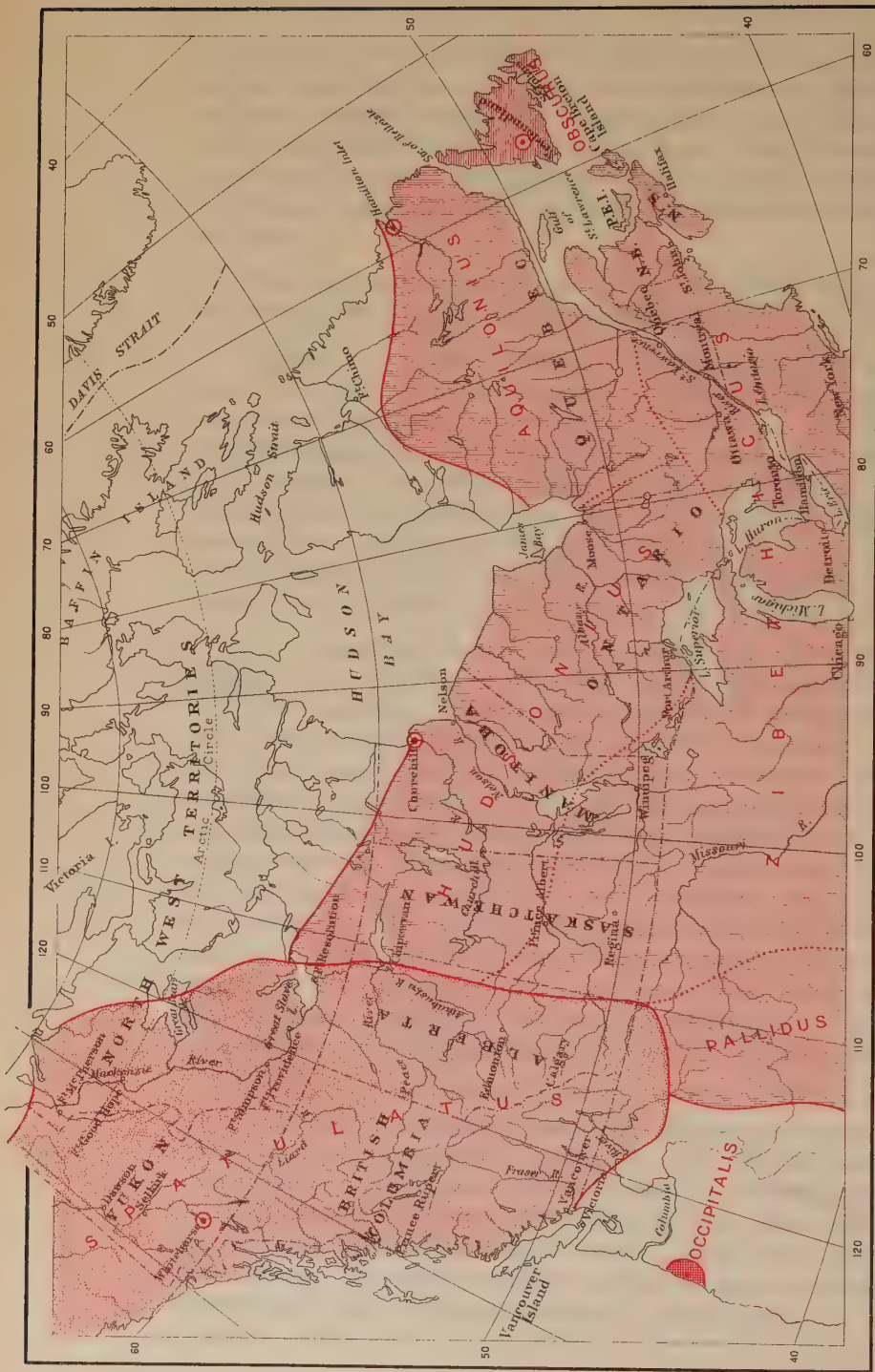
for his work. About the first of August, the skunks dug a hole in the pen and made their escape. That veritably settled my skunk-raising, but, in the fall and winter, I do considerable night hunting with dogs, which I have trained not to take hold of them. I catch them alive and use the pen I have to keep them in until their fur is prime. In that way I have live skunks from the first of November to about the first of January."

The following notes are made from the accounts of Ernest Thompson Seton, who has kept these animals in captivity:

"Gestation is about six weeks. The young run from 4 to 9 in a litter. The young come out to eat when two months old and can be admitted to the general run when four months old. They should be fed heavily in autumn in order to produce the fat on which they mostly exist in winter. The colder the weather, the better the fur. Not more than 50 or 60 can be kept on an acre. A diet of all meat will kill every skunk. Feed once a day in the evening. If the bodies of the skinned animals are fed, they should be thoroughly boiled with vegetables. The oil rendered from the skunk fat is valuable."

Habits of the Skunk The skunk is a burrowing animal and, therefore, like the fox, requires a sunken fence around the enclosure in which he is kept. Woven wire is best for all underground fences as it does not interfere with the drainage and is cheapest. To stop a skunk the fence need not extend more than a few feet above ground, but it should be built at least six feet high with no overhang in order to provide for snow banks and to keep other animals out. In northern regions, where the best fur can be produced, a wooded area will be found the best because it is secluded, provides shade and because the snow there lies level. The nest should be a warm insulated box with a passageway entrance similar to that of the mink nest. All nests should be only barely large enough for a mother to move about in without trampling her young and should not be more than 6 or 7 inches high. Thus the interior will be sufficiently warmed by the body heat.

A method of killing skunks by drowning is mentioned elsewhere. They can also be dispatched easily and painlessly in a poison box, using carbon bi-sulphide gas or hydrocyanic acid. The latter is a deadly poison and is very dangerous in the hands of an inexperienced person. They can also be killed by a blow over the back, which paralyses the muscles and destroys the power to scent. They are skinned by the case method. The skins should be carefully cleaned of fat to prevent heating and should be packed separately for shipping.



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MAP 6.—RANGE OF THE MUSKRATS IN CANADA

Founded on records by J. Richardson, Audubon and Bachman, D. G. Elliot, C. Hart Merriam, E. A. Mearns, E. A. Preble, R. MacFarlane, E. W. Nelson, E. R. Warren, Vernon Bailey, J. Tannin, O. Bangs, R. Bell, W. H. Osgood and E. T. Seton.

The map must be considered provisional and diagrammatic.

The following are recognized:

- Fiber zibethicus* (Linn) with its 4 races,
Fiber spatulatus Osgood. Yukon Muskrat.
Fiber occipitalis Elliott. Oregon Muskrat.
Fiber obscurus Bangs. Dusky, or Newfoundland Muskrat.

RODENTS

THE order of mammals known as rodents are nearly all small-sized and are generally not valuable for their fur. They are distinguished by their chisel-edged teeth, of which they possess two in each jaw. There are no canine teeth and a wide vacant space divides the incisors from the grinders. The rabbit is an exception, having four incisors in the upper jaw.

For furs, the most useful animals of this order are the beaver of the beaver family, the muskrat of the mouse family and the rabbit of the hare family. None except the rabbit can be domesticated, but they can be kept under control to a certain extent, especially the muskrat.

MUSKRAT

(*Fiber Zibethicus*)

While muskrat is one of the lowest priced pelts, it has risen rapidly in value in recent years. In 1911, the best northern muskrat cost the furrier about 80 or 85 cents each and, in 1912, the price of the best skins was approaching \$1.25 each. The price for the trapper is, of course, considerably less, being about 55 cents at the present time. The demand has been increased by the new uses found for this fur. The handsome and popular 'Hudson Bay seal,' which is made from the muskrat, even in our own dressing and dyeing establishments, has given the fur much of its present value. About ten millions of pelts are used annually and the high prices are sure to spur trappers and hunters to greater efforts and, if the fur continues fashionable, may result in the depletion of the species in some sections.

Because of the ease of stocking a marsh and feeding the rat, it is feasible for owners to take charge of their marshes, control the number killed, improve the housing and nesting conditions and supply food by planting suitable crops and feeding vegetables and fruits.

In the salt marshes around Delaware and Chesapeake bays, on the Atlantic coast of the United States, a good quality of rat is produced and the marshes are protected by the owners. The 'ratting' privileges are rented, usually for one half of the catch. Use is made of the fur, the flesh and the musk bags. The flesh, known as marsh hare or marsh rabbit, is sold in large quantities on the Baltimore, Philadelphia, Norfolk and Washington markets and is said to be very agreeable in the fall and early winter, but to be unfit for food in the spring because of the musky flavour. The Indians consider it a splendid dish. In the proper season, canning companies will purchase as much as can be put up.

It is said that the best salt marshes will furnish 50 rats a year per acre. They may be fenced with $1\frac{1}{2}$ -inch mesh wire, 5 feet wide, by burying it a foot on dry land and deeper near water area. Not more than 50 rat houses, or pairs, should be kept on an acre. It is necessary to have an area of water which does not freeze to the bottom. This, in many cases, could be secured by dredging and the mud thrown up would be used by the rats for making homes. Wild rice, water lilies, cat-tails, and various roots, are their natural food. Carrots, beets, turnips, apples, pumpkins and other cheap vegetables and fruits may be grown in nearby fields for summer food, or stored in pits for winter. A small quantity of meat may also be fed.

The muskrat probably has only two litters a year in the colder parts of Canada, but farther south, three litters are born, and the first litters bear young in the autumn. The first are born about the middle of May and each litter numbers from four to nine, although as many as twelve have been reported.

BEAVER

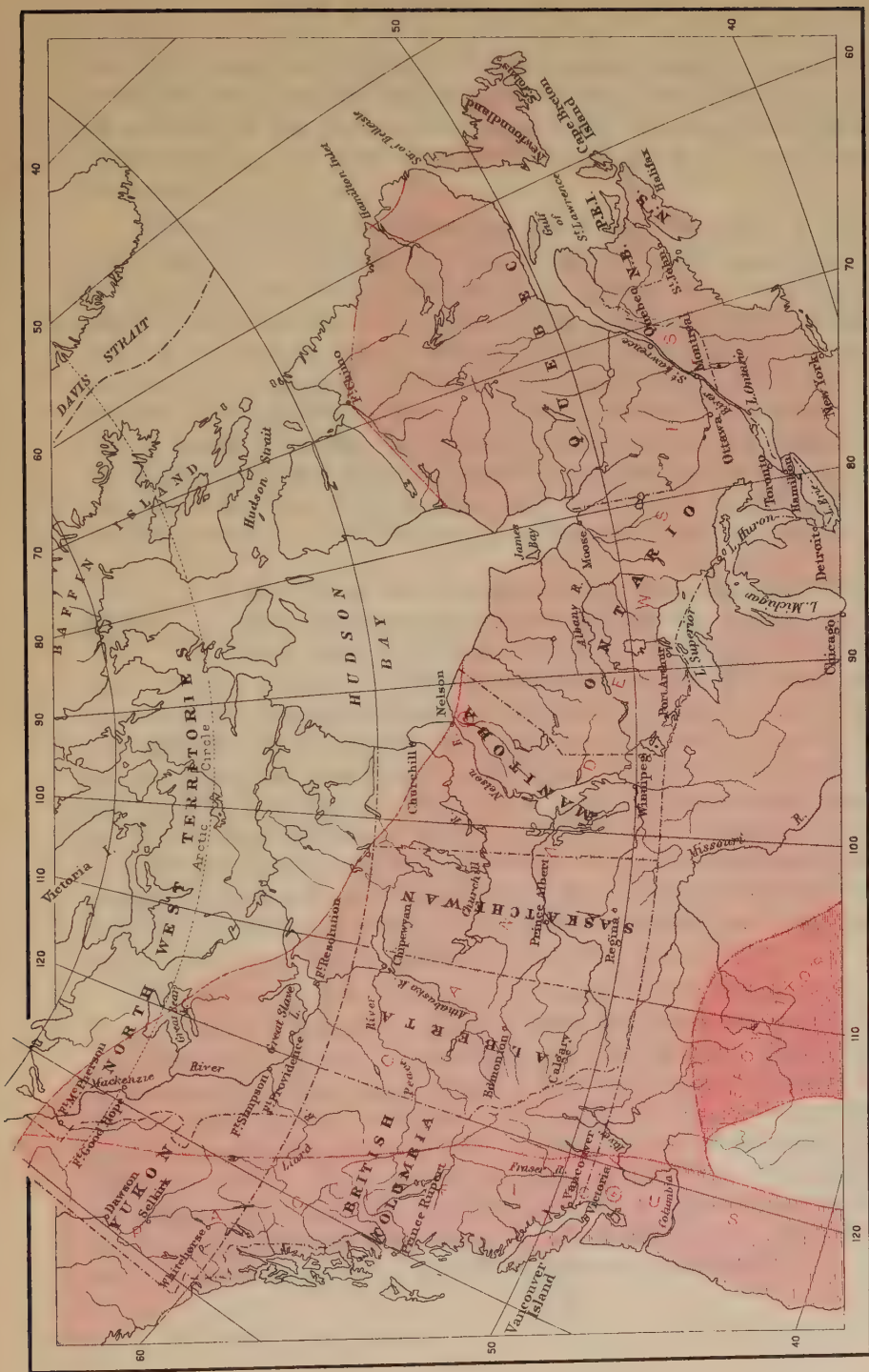
(*Castor Canadensis*)

The beaver formerly existed over nearly all the continent of North America. It was also found in Europe and the greater part of Asia and Northern Africa, but, in most of these, became extinct centuries ago. There are only a few colonies in Europe at the present time and these are preserved carefully by government authorities. It is rapidly becoming extinct in America. The homes of the greatest numbers, at the present time, are in the country between the Great lakes and the St. Lawrence river northward to Hudson bay, and in northern British Columbia.

No animal did more than the beaver to effect the colonization of America. It lured men into the most remote wildernesses, furnished him food and clothing, and was one of the chief articles of commerce with Europe. So universal an article of trade did it become that, in northern Canada, beaver skin became the unit of currency.

Brass estimates the world's production as follows: America, 80,000 skins; Asia, 1,000; Europe, a few. Besides the skins, the castorum, or dry beaver castor, is traded in, bringing from \$12 to \$15 a pound at the present time.

Uses of
the Beaver Because of its interesting habits, every schoolboy is well acquainted with most phases of the life of the beaver. Its flesh, skins and castors are valuable, the latter being used as a base in perfume manufacture. The flesh is excellent and the tail is considered a delicacy. The skin was formerly used in the manu-



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MAP 7.—RANGE OF THE AMERICAN BEAVER IN CANADA

Castor Canadensis Kuhl, 3 races.

Founded chiefly on records by S. Hearne, J. Richardson, L. H. Morgan, Audubon and Bachman, R. Bell, D. C. Elliot, H. Y. Hind, S. N. Rhoads, J. Fannin, E. W. Nelson, O. Bangs, E. A. Mearns, E. A. Preble, V. Bailey, F. M. Chapman and E. T. Seton.

This map must be considered provisional and diagrammatic; the north boundary only is well established.

facture of beaver hats, but, later, this use declined owing to the advent of the silk hat. At the present time, the fur is mostly plucked in dressing and sold for use in coats, stoles and muffs. The largest and finest skins are not worth more than \$15 to \$20, large No. 1 skins being quoted at \$12.

The beaver cannot be farmed because of the wide extent of territory required to furnish food and also because it usually makes trouble for all neighbours in the same water area, whose lands have aspen, poplar, willow or other trees that furnish food. The only possible method is to enclose a large tract for both the forest and beavers that could be produced on it. Patrolling would be necessary and a certain number of beaver would have to be taken each year to maintain the proper supply. Possibly the range of the animals might be limited by fencing across the valleys. Trappers have said that the beaver will eat cultivated crops (*e.g.*, turnips), but no proof of this statement could be found. If it eats such crops, ranching the beaver is feasible.

National Game Preserves The logical method to perpetuate the beaver is to create national game preserves under constant patrol. This plan has proved successful in the Algonquin National Park, Ontario, where a considerable revenue is now derived from the sale of their skins. A system of national parks where the beaver and muskrat would be efficiently protected and where other wild life would be propagated as well as protected is advisable. Protective laws, particularly in the case of the beaver, do not protect. During the years when the beaver was contraband in Ontario and Quebec, bales of furs frequently contained a number of beaver skins. The bale was sold as it was packed, or another customer was sought. Thus, many Montreal furriers testified that they purchased beaver skins continually and could not avoid it, if they wished to continue to buy raw pelts.

For the information of those who desire to keep a few pairs of these interesting animals, it may be stated that when two years old, the beaver mates for life, mating taking place in February. The period of gestation is about three months. The litter usually consists of two or three, but may be larger. The young are weaned before they are two months old and taught to eat tender shoots of the raspberry and other plants. They accompany their mother the whole season. Foundation stock may be obtained from the Department of Lands, Forests and Mines, Toronto, Ont., at about \$50 a pair. Success is easily achieved where water and the proper food are available.

REINDEER AND MOOSE

THE United States Congress, in 1892, at the instance of Dr. Sheldon Jackson, appropriated \$240,500 to establish herds of reindeer (*Rangifer tarandus*) in Alaska. Twelve hundred and eighty reindeer were imported before 1902, when the Russian government withdrew its permission to make shipments from its territory. More lately Dr. Grenfell has established herds in Labrador. Both herds are entirely successful in providing labour, transportation, skins and food for the more primitive people of Canada and Alaska. The native reindeer of Canada, comprising the woodland caribou (*Rangifer caribou*) and the barren-ground caribou (*Rangifer arcticus*) might produce a domestic animal of a type superior to its European cousin. In any event, the European reindeer might possibly be improved by crossing with the woodland caribou, which is stronger and larger.

The following interesting account of the introduction of reindeer to Canada was contributed by R. H. Campbell, Director of the Forestry Branch, Department of the Interior.

THE REINDEER IN CANADA

"The earliest recorded attempt to domesticate reindeer on this continent is that of the United States government which, about 1892, imported a herd of Siberian deer to Alaska for that purpose. Several small herds have since been imported and, as the result of careful and intelligent handling, there are now some 15,000 domesticated reindeer in Alaska. The deer are used for practically all the purposes for which domestic cattle may be used and are, in addition, very useful for transportation purposes.

Transportation in the Arctic "The problem of transportation is, aside from the severity of the weather, the most serious with which dwellers in the arctic regions have to deal. The cost of grain and hay, neither of which is grown in any considerable quantity, precludes the use of horses or cattle for transportation purposes and, prior to the introduction of reindeer, dogs were used almost entirely. While Eskimo, or husky, dogs make excellent beasts of burden, their usefulness is seriously impaired by the necessity of hauling with them sufficient fish or other food for their own subsistence. As on long trips they can haul little, if any, load beyond their own food supply, this seriously limits the sphere of a dog's usefulness. Reindeer, on the other hand, while quite as hardy as the best train dogs and

able to haul somewhat larger loads, find their own subsistence in the moss which covers practically all of the sub-arctic region. No matter how cold the weather, or how deep the snow, the deer can paw their way down to the moss and thus keep themselves in good condition on the longest and roughest trips. Another point in favour of deer is that, should misfortune overtake a party of Arctic travellers and it become necessary to kill the transport animals for food, the flesh of the deer is palatable and nourishing, while only dire necessity would impel anyone to use dogs for food.

"It seems to have been the idea of the United States government that the establishment of large herds of domesticated reindeer in Alaska would be a long step in the direction of solving the transportation problem of that district and, in addition, would, to a considerable extent, provide a food supply for the natives who otherwise would, from time to time, become charges upon the public treasury.

"This experiment by the United States government was followed with great interest by many Canadians who were interested in the development of our northern territories, and particularly by Dr. Wilfred Grenfell, who, in connection with his medical missionary work on the Labrador coast, found himself confronted by practically the same conditions that obtained in Alaska, viz.: severe climate, absence of means of winter transportation other than dogs, and scarcity of food supply for natives and fishermen during periods of unusually severe weather.

**The Reindeer
in Labrador**

"At Dr. Grenfell's request, the Dominion Government, in 1907, purchased a herd of some 300 Norwegian reindeer. These were handed over to Dr. Grenfell to be used by him in connection with his work. It was originally intended that the herd should be established on the North shore of the gulf of St. Lawrence, but he finally decided that his mission station at St. Anthony, on the northeast coast of Newfoundland, was a more suitable place for the experiment. There is an abundance of reindeer moss at, or near, St. Anthony, the climate is in all respects suitable and, should occasion require it, the deer can readily be shipped from there to any desired point on the Labrador coast as conveniently as from the point first selected.

"Dr. Grenfell's experiment proved successful from the start and his herd of reindeer now numbers over 1,200. A considerable number of stags and barren does have been killed for food and there have been the usual unavoidable losses by death and accident. He reported in May, 1911, that the meat is excellent and the skins valuable and that, in his opinion, reindeer will, in the future, be as valuable in Labrador as in Alaska and will afford an export industry of meat from a district

where it is not probable that wheat, corn or other cereals can ever be profitably produced.

**Reindeer in
the Northwest** "During the summer of 1910, His Excellency the Governor-General, Earl Grey, visited Dr. Grenfell's mission station on his return journey from Hudson bay. His Excellency was greatly interested in the reindeer experiment, and having just seen a considerable part of sub-arctic Canada, was impressed with the desirability of further extending the experiment by the establishment of herds in portions of the Northwest territories. He subsequently discussed the question with Hon. Mr. Oliver, then Minister of the Interior, with the result that an arrangement was made with Dr. Grenfell to supply fifty reindeer to the Dominion Government at what the animals had actually cost him. It was decided that the reindeer should be sent to a suitable place near Fort Smith, on the Slave river, at the extreme northern boundary of Alberta. In addition to the reindeer, Dr. Grenfell was to supply two herders and one apprentice to look after the herd, three trained dogs and a supply of moss sufficient for the journey from Newfoundland to our Northwest.

"There was no choice as to the time of year when the reindeer were to be shipped. They could not be taken across the continent in summer weather as they could not stand the heat. They could not be taken across in winter unless provision were made for a supply of reindeer moss near Edmonton, as the rivers are frozen and they could not be transported beyond that point. They could not be moved in the spring as that is the fawning season. There was, therefore, only the short season left between the close of summer and the 'freeze-up' of the northern rivers.

"It was arranged with the Department of Marine and Fisheries that one of their steamers should call at St. Anthony for the reindeer early in September, 1911, and take them to Quebec, from which point they would be sent by train to Edmonton. If the boat had proceeded direct to Quebec, it is probable that there would have been very small loss of deer, but the steamer had to stop on the way to take on board a cargo of powdered gypsum, and the effect on the reindeer was serious. Four deer died before the steamer reached Quebec and five more on the train after leaving Quebec; and, from the symptoms it is practically certain that death was caused by inhalation of gypsum dust.

"It was a somewhat difficult matter to transfer the reindeer from the boats to the cars awaiting them at Quebec, but this was finally accomplished and the trip to Edmonton and from there, sixty miles further on to the end of the steel, was made expeditiously, most of the reindeer reaching this point in good condition.

"From the end of the steel to Athabaska Landing, something over fifty miles, the deer were conveyed in waggons and were then loaded on scows for the trip down to Fort Smith. This turned out to be the most difficult part of the trip. The scows were hard to manage and a great deal of ice was encountered which hindered progress. In the end it was found impossible to get as far as Fort Smith, and it was decided to remain at a point seventy miles from the fort, where reindeer moss was plentiful, until such time as the deer could be driven to their destination, or until the spring, when they could be conveyed down the river. The herd was kept here very comfortably until the spring, and on the 20th May, 1912, reached Fort Smith, the total loss of deer *en route* being nineteen.

"The herd wintered satisfactorily and were in good condition in the spring. The chief herder had selected a suitable place for them west of Fort Smith on a point jutting out into a lake lying south of Great Slave Lake. There is plenty of reindeer moss in this locality and it seemed in every way suitable for the keeping of the herd. However, the flies became so troublesome to the herd in the summer that they stampeded and, at last reports, had not all been gathered together again.

"A new range for the deer has been selected on a large island in Great Slave lake and it is the intention to move the remainder of the herd there this spring.

"Considering the difficulties of transportation, the shipment was taken through with comparatively small loss; but the success of the herd is not fully assured until it is certain that they can be controlled and prevented from stampeding at the time when the flies are most active. If matters go satisfactorily with them for another year, it may be advisable to consider increasing the number by a further shipment."

MOOSE

The European moose was formerly under domestication and proved valuable for transportation purposes in the cold northern countries. It is on record that it once hauled a sleigh 234 miles in one day. For divers reasons—the chief one being that exiles used it to effect their escape—it became unlawful to maintain the moose in captivity in some countries. Probably it would have developed into a valuable domestic animal for northern latitudes had this prohibition not been imposed. It is possible also, that the Canadian moose, which is of greater size and strength, could be developed into a domestic animal of value. Several cases are recorded of its being successfully used for draught purposes, in the first generation from the wild state. It is but just to add, however, that the moose has not yet been bred in captivity.

IV. Preparing Skins for Manufacture

MAMMALS which have a short, fine, soft coat of fur through which grows hair, usually of greater length, variously called overfur, water-fur, guard-hair, are known as fur-bearers. To provide more warmth for the animal, the coat of fur and overhair is usually thicker and longer in the winter; hence, furs taken in winter, or when prime, are more valuable than those taken in warmer weather.

Pelt of a Fur-Bearer When the skin is unprime, it has a bluish appearance on the flesh side down the back and sides; when prime, it is of a whitish or creamy colour. An experienced furrier can by the appearance of the skin and of the overhair, determine the season at which it was taken. It is desirable to capture fur-bearers when prime, because the fur and overhair are fuller and heavier and will not fall out easily, as commonly occurs in 'springy' pelts. It is also desirable to take skins shortly after becoming prime, which is usually about the first of December, immediately after the first winter weather. When taken then, the pelt is better coloured and less worn. In a climate like that of Prince Edward Island, where winter sets in about Christmas the last week of the year is chosen for killing the fox. The pelts of the majority of animals become prime late in November.

The fur, or, as it is called in relation to the hair, the underfur, consists of soft, silky, downy, curly filaments. It is usually short and thick, and towards the skin it grows lighter in colour. It is barbed lengthwise and hence is capable of felting—a quality not possessed to so great a degree by wool or silk, which is best handled by spinning and weaving. In a prime pelt the underfur is hardly discernible unless the overhair is blown apart. Then the light colour of the underfur appears. If it were generally known that the undyed skin is whitish and that the underfur close to the skin is a light drab, or pale blue colour, it would not be so easy to sell dyed skins as natural."

The overhair is straight, smooth and, usually, comparatively rigid. It is scattered throughout the fur and, on the living animal, prevents the fur from felting. It serves as a protection against cold and storm as well as against injury. In the case of the fox, which lies out in the open, exposed to the coldest northern weather, the dense overhair, sometimes over six inches in length, protects the body, while the toes and face are protected by the immense tail, which covers them when the fox lies down. The beauty of a pelt is due largely to the overhair. It is the glossy black or the amphimaculated silver-black overhair that makes the silver fox one hundred times more valuable than his red

full-brother. Some kinds of animals, as, for example, the beaver and the otter, have overhair which is not always considered as beautiful as the underfur alone. Thus, they are put through a process of pulling and the manufactured skins are usually plucked.

Usually animals intended for slaughter are fed well and are carefully housed so that no injury can be done the overhair, such as from rubbing, the attachment of burrs or from lying in dirt. The killing presents no difficulty except that it must be done so as not to alarm the breeding animals. Therefore, in most cases, the animals to be slaughtered should be removed to the finishing pens in the autumn. The fox is usually killed by crushing the chest with the foot, a man's weight applied just back of the foreleg being sufficient, or the head may be forced back until the neck is broken.* Skunk, on account of its liability to scent, presents the greatest problem. It can be removed from its regular pen, however, by a wire snare placed on the end of a long pole. It is then dispatched outside its pen by the usual method of clubbing. If scenting is feared, it may be drowned in a tub of water.

There are two distinct methods of removing the skin. Some animals are opened down the belly, as in skinning a sheep, and the skins are stretched flat or 'open'. Others are slit up the hind legs to the vent and the skin is stripped off the rest of the body. These are stretched by a board wedged inside and are said to be 'cased'. The methods of skinning in use for common Canadian fur-bearers are as follows:

Cased—Fox, marten, fisher, weasel, otter, skunk, lynx, cat, muskrat.

Either Cased or Open—Raccoon, wildcat.

Open—Wolverene, badger, beaver, wolf, bear.

The process of removing a cased skin is well described by the *Fur News Magazine* as follows:

"Slit skin on both hind legs on the under side of animal from the heel to the vent; skin out the legs to the feet, and in the case of mink, skin out the toes and leave them and the claws on the skin. Skin around the tail, leaving the tail on the back of the skin, and after loosening the tail bone at the base, take hold of it with your forefinger and pull it out of the tail. If the tail bone is hard to remove, split a stock, insert the tail bone in split, and with this to grip the bone, you should have no trouble to pull it out.

*See page 47.

"Now turn the skin back and carefully pull it off the body. Use a knife to start the skin if it does not come off easily, but be careful not to cut the pelt. Skin so that as little flesh and fat adhere to the skin as possible. When the front legs are reached, skin around them near the body and then push them backward out of the skin—turn them inside out, as we might say. Skin out the legs to the paws in the case of mink, keeping them on the skin; for the other animals cut off the legs at the first joint. Skin carefully around the head, pushing the skull back through the skin until the ears are reached; these should be cut off as near the skull as possible, so that they remain attached to the skin. Then carefully skin around the eyes, not cutting the eyelids, and when the mouth and nose are reached use care also. Do not pull the skin off the head, but remove carefully, for the heads of some animals are used in manufacturing the furs, and all skins have a better appearance if the head is skinned out with care."

Skunks and raccoons present some special problems. They fatten in the fall and go to their dens in cold weather. Therefore, those designed for slaughter must be segregated from the breeders before cold weather sets in or they cannot be captured without disturbing the nest. After skinning, also, a large quantity of fat adheres to the skin. This must be scraped off or it may heat and decompose the skin. Skunk fat should be kept and rendered into oil. In baled shipments, also, the grease of these skins is liable to injure other skins in the same pack. They should be specially wrapped in burlap and, because of their odour, it may be advisable to box the skunk skins separately.

The flesh and fat are removed from skins by a dull knife or hatchet. The skin is slipped on a fleshing board with dulled corners, having one end in a grease pan and the other against the skinner's chest. The fat is pushed off the skin towards the tail. Much scraping of the skin is injurious, it being necessary to remove only the fat and loose flesh. The tail may give trouble if it is not split and scraped. Sometimes salt is dropped into it to prevent decomposition; but in no case is salt nor any other preservative, applied to any other part of the skin. Often the tip of the tail is cut off to allow circulation of air inside and to drain out the fat.

Open skinning presents no difficulty. The legs are cut off at the first joint and split up the inside to the slit which is cut along the belly from the lower jaw to the vent. The tail is cut open to extract the bone.

The cased skins are stretched on a wedge-shaped board, fur side inwards. The edges of the stretching board are along the sides of the pelt, the dorsal surface of the pelt being

Stretching



BEAVER
(stretched in hoop)



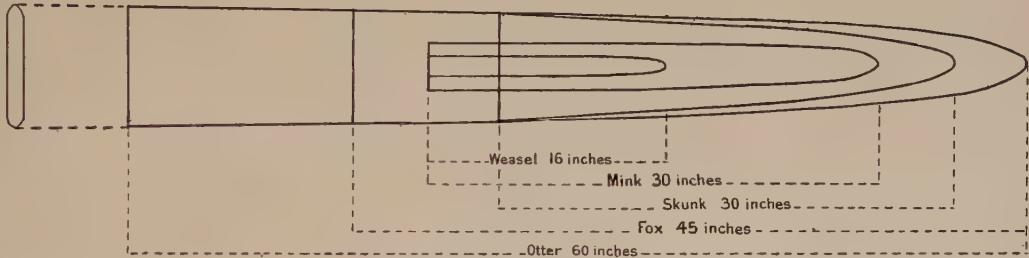
RACCOON
(cased)



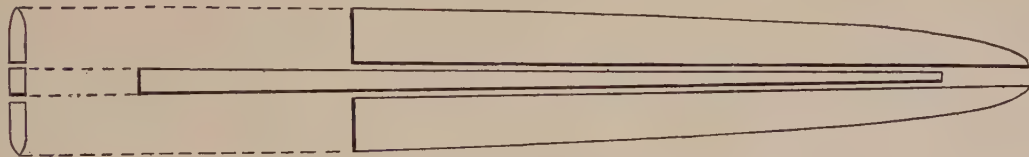
MINK
(cased)



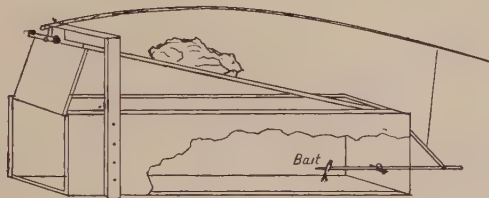
MUSKRAT
(cased)



STRETCHING BOARDS



STRETCHING BOARDS WITH CENTRE WEDGE



BOXES FOR CATCHING LIVE ANIMALS

wholly on one side of the board and the ventral on the other side. All skins except fox are marketed fur side inwards, fox being turned fur out after one day's drying, when the front legs are still pliable. Skins should be dried without artificial heat. A cool, dry place away from the sun's rays is best. Beaver skins are stretched within an elliptical hoop made of saplings. They are tied to the hoop with twine laced into the skin at intervals of two inches. Bear skins are usually laced similarly into a rectangular frame made from small sticks. Raccoon are nailed on a wall or board and stretched into a rectangular shape. The best nails are brass tacks or wire nails and they should be driven not more than two inches apart.

Otter tails are always split and stretched by nailing to the stretching board.

Stretching Boards Boards should be made of soft wood, like white pine, which permits easy driving and withdrawal of nails. For smaller animals, the stretching board should be about three-eighths of an inch thick, and for the larger—otter and fox—about five-eighths or three-quarters of an inch. It should be nicely rounded on the edges. Wedges are sometimes inserted down the sides of the board with advantage. They permit the circulation of air on the inside. A steel wire has served well in stretching muskrat on many occasions.

The best stretched skins are those that are extended very slightly in all directions. Mink and marten should be pulled slightly lengthwise and the lines of the sides should be only slightly converging. A stretching board may be split and a wedge inserted between the two sides will adjust it to any size of skin.

Marketing Skins Valuable pelts are sewed up in muslin and expressed to destination. When shipped by express care should be taken to have the agent mark the full value of the skins on the receipt to ensure recovery of value if lost. When packing skins do not roll them; pack flat and then sew them up neatly in burlap. They should be wrapped in paper first. Label the package inside and outside to make identification certain. Skins must be packed dry and must be kept dry.

If all the pelts taken in Canada were prime and were properly stretched, dried and marketed, the increase in value would amount to millions. Nearly fifty per cent. of the pelts of some species are blue, or springy or with hair rubbed off or falling out. The competition between trappers is producing more and more blue pelts, which cannot grade above No. 2. Conservation of fur would be achieved if it were illegal to kill except when the pelts are prime. It is probable, how-

ever, that only personal ownership of the fur-bearers would ensure nearly 100 per cent. of the pelts marketed being prime.

The fur moth also causes immense losses. Modern refrigeration, however, has solved this problem by providing cold storage chambers for furs stored in the warm season.

Dyeing of Furs

All seal and Persian lamb skins go through a process of dyeing. Seal skin, after the water hair is plucked, is of a drab colour, but expert English dyers make it a dark-brownish black. As German dye excels in fastness of colour and in leaving the skins supple after treatment, the Persian lamb skins are mostly dyed in Germany. The French are very skilful in 'topping' where the overhair is made to imitate sable. Latterly, the Germans have developed a large trade in 'pointed fox,' which is an ordinary cheap fox dyed black, and afterwards 'pointed' by sewing in white hairs. The German dyed article is quite durable in colour; but it, again, is imitated by furriers in America, who colour with ordinary black dye and glue in badger hairs. In a few months the difference in the quality of the dye used is revealed. Good dyes—such as those developed in England for seals and in Germany for lambs—are likely to remain trade secrets.

The dressing and dyeing of furs in Canada is nearly all performed by one firm which handles about 2,000,000 skins annually. The workmen and experts are largely German and other Europeans and have received their training in the old world. The dressing and dyeing of furs in America is steadily improving and the proportion shipped to Europe is decreasing.

Esteemed Natural Colours

The natural colours must be of a certain quality to be highly esteemed. Thus pure white ermine is costlier than the gray or yellowish-white kinds. With white furs, it is the purest and, with black furs, it is the densest that are most desired. A brownish colour in a silver fox is very objectionable (although common in most districts), while a bluish cast is decidedly to be preferred. In fact, it is almost axiomatic that a bluish cast, instead of a rusty or brownish, is preferred. It is the brown cast of Hudson Bay marten that makes it inferior to the Russian sable, which often has a bluish-brown colour. The predominance on the market of brown or rusty coloured skins can be readily accounted for when it is remembered that most 'springy' skins are brownish, no matter how blue-black, or blue-brown, or blue-gray they were when prime.

Dressing Furs

The modern art of dressing and dyeing furs is a great improvement on pioneer methods, especially in dyeing and finishing. For giving suppleness and durability, the pri-

mitive methods are excellent; thus, the North American Indians and African Kaffirs are unrivalled dressers of leather.

Older Methods The older method of dressing furs, used universally until the introduction of machinery, is to "place the skins in a lye of alkali; when the pelt has become soft, the skins are tubbed, and then shaved by passing them over a large knife and placed in an upright position; they are next buttered, and put in a large tub of sawdust by men half naked, who tread on them for some time, the heat of their bodies rendering the leather soft and supple; they are then beaten out and finished."

Modern Methods Modern methods of dressing and dyeing are much different. The work is done in large factories where an expert handles every department and machinery does most of the tramping and beating. Invention has made possible the use of many commoner and cheaper skins which undergo many operations in the course of their preparation. They may be beamed, scraped, tramped, soaked, fleshed, tanned, dried, drummed, greased, kicked, drummed with sawdust, dyed, caged, shaved, pared and foot-tubbed before they are ready for the manufacturer. Most of this work is done by machinery, and the large numbers of skins put through at one time makes the product uniform and the cost much lower per unit than by the old-fashioned hand-and-foot process.

Apparatus Used Besides the engine or motor which supplies the power, the following apparatus is used:

Washing tanks, which are made of wire mesh and revolve in a tank of water;

Drying vats, which revolve very rapidly, to throw moisture out of the skins;

Cleaning drums, which, with an exhaust air arrangement, remove the sawdust or corn starch from the skins;

Polishing drums, which revolve the skins with sawdust to polish the fur and hair;

Wooden tanks, for dyeing;

Revolving stone cylinder, for beaming;

Kicking machine, for pounding the skins;

Sewing machine, built especially for joining fur;

Clipping machines, for shearing the underfur even.

There are chambers for drying skins, where the air is kept constantly in motion by exhaust fans, and many other tools or contrivances for hand work, such as crescent-shaped sharp knives, for fleshing, rope for roping, tubs for tramping, knives, combs, boards for stretching, etc.

As treatment varies so much, it is impossible to list the operations a given skin goes through. Marten, for instance, has a tender skin and has to be given hand treatment. Mink and fox are treated in a Canadian fur-dressing establishment about as follows:

Fox	MINK
Pounded	Pounded
Wet with wet sawdust	Soaked to soften head
Fleshed	Fleshed
Salt water put on skin	Flesh pickled
Dried	Dried
Broke in foot-tub	Drummed with sawdust
Buttered or greased	Greased and pounded
Tubbed	Stretched
Cleaned with sawdust in drum	Drummed (sawdust)
Dried	Stretched
Polished in drum with sawdust	Drummed (sawdust)
	Stretched and beaten
	Dyed

**The Process
of Manufacture***

"At the fur dressers' the skins are first dampened on the flesh side with salt water and left all night to soften. The following morning they are placed in a tramping machine, where they are tramped for eight or ten hours. The machine works about 2,000 pelts at a time.

"The pelts are next covered with a mixture of sawdust and salt water, and remain so overnight. The following morning they are cut open down the front and are then fleshed, one man being able to flesh 200 to 300 in a day. The skins are next stretched and hung up to dry. When thoroughly dry, they are again moistened with salt water on the leather side, remaining so overnight. They are next brushed on the flesh side with animal fat—butter or fish oil and tallow—and laid in pairs, with fur side out. After remaining overnight they are placed in tramping machines and worked for six or eight hours, or until thoroughly soft and pliable. They are then stretched in every direction.

"The next process is cleaning. The skins, to the number of 300 or 400, are placed with sawdust in revolving drums exposed to steam heat. They are revolved for about three hours, when the sawdust will have completely absorbed the grease. The skins are next incased in a beating drum, where they are revolved for two or three hours. On removal, they are beaten with rattans, and the

*An abridgment from Chas. H. Stevenson's report in that of the United States Commission on Fish and Fisheries for 1902.

fur is cleaned with a comb. The heavier pelts are fleshed down thin, thus completing the operation of dressing for the majority of skins."

Well-dressed furs afford a maximum of warmth for a minimum weight, while their suppleness lends an additional advantage to them for clothing purposes. The warmest garments of manufactured material are made from the stiff old-fashioned box cloth and, even where warmly lined, afford only two-thirds as much protection from the cold as fur, while being more than four ounces per square foot heavier than raccoon. The following table furnishes an approximate estimate of comparative weight and durability of the various furs when worn, fur outside, as body clothing:

COMPARATIVE DURABILITY AND WEIGHT OF FURS

	Points of Durability	Weight in Ounces Per Sq. Foot
<i>The Costly Furs—Standard, Sea-otter</i>		
Sea-otter.....	100	4½
Seal.....	75	3
Sable.....	60	2½
Silver or Black Fox.....	40	3
Ermine.....	25	1½
Chinchilla.....	15	1½
<i>The Less Valuable Furs— Standard, Unplucked Otter</i>		
Otter (unplucked).....	100	4
Otter (plucked).....	95	3 15/16
Beaver (sheared).....	90	4
Beaver (plucked).....	85	3 15/16
Raccoon.....	75	4½
Skunk.....	70	2½
Mink.....	70	3½
Persian Lamb.....	65	3½
Baum Marten (natural).....	65	2½
Sable.....	55	2½
Stone Marten.....	40	2½
Northern Fox (natural).....	40	3
Muskrat (natural).....	37	3½
Opossum.....	37	3
Muskrat (plucked, sheared and dyed).....	33	3½
Nutria.....	27	3½
Lynx (natural).....	25	2½
Squirrel.....	25	1½
Fox (dyed black).....	25	3
Lynx (dyed black).....	20	2½
Fox (dyed blue).....	20	3
Broadtail.....	15	2½
Marmot (dyed).....	10	3
Moleskin.....	7	1½
Hare.....	5	1½
Rabbit.....	5	2½

V. The Commerce in Raw Furs

THE raw furs of America are mostly collected by large companies having elaborate systems for gathering the skins from the trappers. The chief operators in Canada are the Hudson's Bay Co. and Revillon Frères, and, in Labrador, the Harmony Co. During the past ten years a change has been taking place in marketing and many furs, particularly the more valuable ones, are consigned direct to London or to American fur houses. In the Old World, furs are collected at fairs at the following places:

TOWN	TIME OF FAIR
Frankfort-on-the-Oder.....	January
Irbit, Siberia.....	February
Leipzig, Germany.....	Easter
Nijni-Novgorod, Russia.....	August
Ishim, Siberia.....	December

Many of the skins, particularly those of finer quality, are ultimately offered at the London sales where the majority of the world's fine furs are sold. In recent years, however, Germany and the United States have been purchasing a larger proportion.

Quantities of Skins The total sales in London are generally utilized in estimating the quantities of furs at the world's disposal. Of the undressed skins not usually sold at London sales, there are the Persian lambs, broadtails and karakules, of which Thorer estimates that 2,900,000 come to Leipzig alone. A United States consular report of 1911 estimated that Russia produces 4,525,000 squirrels, whose raw pelts are valued at \$2,000,000. Of squirrel tails, Russia, in 1911, produced twenty-one tons, valued at \$5.50 per pound. Owing to the growing popularity of muskrat or 'Hudson Bay seal', the use of this skin has increased enormously and the sales now amount to over 9,000,000 annually, London selling 6,000,000, Leipzig, 1,000,000 and America retaining 2,000,000. Two hundred thousand ermine pelts, valued at \$350,000, are sold annually in Russia. About 83,000,000 rabbit skins are imported into Great Britain annually, while immense quantities of skins are used in the felting industry in Australia.

Centres of the Fur Trade Leipzig, Germany, is the most important city for the dressing and manufacture of furs. Its raw supplies are drawn from all parts of the world but particularly from London and Moscow storehouses and the Nijni-Novgorod Fair. Moscow is the largest storehouse for Russian and Asiatic furs, while New York, St. Louis and Montreal are important American centres which are rapidly increasing their facilities for fur-dressing and fur-dyeing. London is the largest selling centre and is still of great importance in the dressing, dyeing and manufacturing of furs.

THE LONDON FUR MARKET

The London
Auction Sales

Many skins are manufactured and used in the country of their origin, but the bulk of the world's fine furs are sold at auction in London. These sales are held in June, October, January and March, but most skins are sold at the winter sales, particularly the March sale, which attracts numerous buyers from all parts of the world. A large proportion of the pelts are purchased by brokers on a commission basis. The Hudson's Bay Company's auction sales are held first and, as no reserve bids are placed on the skins offered, the results are taken to represent the state of the market. Messrs. C. M. Lampson and Co., Messrs. A. and W. Nesbitt, Frederick Huth and Co. and Henry Kiver and Co. are the chief firms selling American furs.

LONDON FUR SALES FOR THE YEAR ENDING MARCH 31st, 1906

Size in inches	Kind of Fur	No. of Pelts	Size in inches	Kind of Fur	No. of Pelts
24 x 12	Badger.....	28,634	27 x 13	Lamb, Tibet.....	794,130
	" Japanese....	6,026		Leopard.....	3,574
72 x 36	Bear.....	18,576	45 x 20	Lynx.....	88,822
36 x 24	Beaver.....	80,514	18 x 12	Marmot, linings and skins, equal to.....	1,600,600
9 x 4½	Cat, civet.....	157,915	16 x 5	Marten, Baum....	4,573
18 x 9	" house.....	126,703	16 x 5	" Japanese....	16,461
30 x 15	" wild.....	32,253	16 x 5	" Stone.....	12,939
9 x 4	Chinchilla, bastard.	43,578	16 x 5	Mink, American...	299,254
12 x 7	" finest....	5,603		" Japanese....	360,373
	Deer, Chinese.....	124,355	30 x 15	Mouflon.....	23,594
12 x 2½	Ermine.....	40,641	12 x 8	Muskrat or Musquash, brown....	5,126,339
30 x 12	Fisher or Pecan....	5,949		black.....	41,788
12 x 3	Fitch.....	77,578	20 x 12	Nutria.....	82,474
20 x 7	Fox, Blue.....	1,893	18 x 10	Opossum, American	902,065
24 x 8	" Cross.....	10,276	16 x 8	" Austral'n	4,161,635
27 x 10	" Grey.....	59,561		Otter, land.....	21,235
	" Japanese....	84,219	50 x 25	" sea.....	522
	" Kit.....	4,023	20 x 12	Raccoon.....	310,712
24 x 8	" Red.....	158,961	17 x 5	Sable, American...	97,282
24 x 8	" Silver.....	2,510	14 x 4½	" Japanese....	556
20 x 7	" White.....	27,463	15 x 5	" Russian....	26,399
	Goats, Chinese....	261,190	40 x 20	Seal, fur.....	77,000
24 x 9	Hares.....	41,256		" hair.....	31,943
	Kangaroo.....	7,115	15 x 8	Skunk.....	1,068,408
	Kid, linings and skins, equal to...	5,080,047	10 x 5	Squirrel.....	194,596
12 x 2½	Kolinsky.....	114,251		" linings....	1,982,736
	Lambs, linings and skins, equal to...	214,072		Tiger.....	392
	Lamb, slink.....	167,372	50 x 25	Wallaby.....	60,956
			16 x 18	Wolf.....	56,642
			20 x 12	Wolverene.....	1,726
				Wombat.....	193,625

Note.—The Persian lambs, astrachans and Russian squirrels are sold and manufactured in Russia and Germany.

A report made in the spring of 1911 by the United States commercial agent at London, Mr. J. D. Whelpley, to his government at Washington, and published by the Bureau of Manufactures of the Department of Commerce and Labor, gives considerable information on the London fur trade. The following extracts from it are informative:

"London is the fur market of the world, and the prices paid at its famous auctions are the determining factors in making prices the world over. Practically all the fur gathered during the year is sold at one or other of its five auction sales. The first is held in January, the second in March (by far the largest and most important), another in June, and a fourth in October. In December is held the annual seal sale, at which nearly all the seal furs taken during the previous 12 months are offered. This selling of the furs in one market has its advantages, especially from the viewpoint of the sellers. With so many diverse interests, representing practically every country in the world, it is utterly impossible to form a dealers' 'ring', as would almost inevitably result if the furs were offered in a smaller and more restricted market. That, probably, is one of the considerations that brings the furs over thousands of miles of land and water at considerable expense to be sold in London and returned for final disposal, perhaps, to places within a few miles of their capture.

"There was a time when only dealers bought furs at these great auctions. Now, however, several of the larger and richer wholesalers bid, eliminating the dealers' profit. The principal reason why this is not done to a larger extent is a financial one. Few of the wholesale houses wish to tie up capital for the long period necessary if they buy direct from the auctioneers. Buying for cash in January and March, it is in many cases close on to a year, and in some cases, when business is poor, two years before the wholesalers and manufacturers can hope to realize on their investment. On the other hand, the dealers extend liberal credit terms to their customers, and consequently the burden on the latter is not such a heavy one.

"Information concerning the fur trade of London is most difficult to obtain, owing to the nature of the business and the reticence of those engaged in it. Prices vary so much in any one skin that the rise or fall can be determined only by experts, and then merely approximately and by very general averages.

"There are no detailed figures as to British imports or exports. The only way in which the imports of any particular skin can be determined is to totalize the sales. This is difficult and unsatisfactory, as there are several small sales and some private offerings in addition to the great fur auctions. The English trade returns for 1910 give the

imports of undressed fur skins as 82,327,101 rabbit skins, value \$3,675,483; 333,033 seal skins, value \$1,491,573; and 18,515,682 other skins, value \$15,390,209. In 1909, when the total number of undressed rabbit skins imported was 66,135,374, valued at \$2,548,537, the countries supplying the larger quantities were: Germany, 39,462; Belgium, 11,255,772; France, 3,845,158; Australia, 43,442,559; New Zealand, 7,379,960. Of the undressed seal skins imported in that year the United States furnished 24,556, Russia, 27,980; Norway, 60,694; Japan (including Formosa), 11,398; Cape of Good Hope, 15,061; Newfoundland and Labrador, 126,796; the total imports amounting to 288,055 skins, valued at \$1,328,219. Undressed unclassified skins aggregated 17,960,661, and had an import value of \$11,285,180; of these the United States supplied 6,426,851; Russia, 750,868; Germany, 3,370,525; China (exclusive of Hong Kong, Macao, and Wei-hai-wei), 507,637; Japan (including Formosa), 85,692; Chili, 46,558; France, 47,754; Australia, 5,499,814 and Canada, 987,321. Dressed rabbit skins numbering 537,051 and valued at \$80,098; 18,608 dressed seal skins, value \$490,339; and 4,856,818 dressed skins, not classified in the customs returns but having a value of \$4,318,688, were also imported into the United Kingdom during 1909, as well as manufactures of skins and furs (including skin rugs) worth \$5,005,122, thus giving a grand total for the 1909 imports of dressed and undressed furs and manufactures of furs and skins of \$25,056,183.

French Competition

"Of late years some big firms, notably one French house, with branches in London and the United States, and several American houses located in Philadelphia and elsewhere, have been dealing direct with the trappers, thus avoiding the London auction sales altogether. The French firm is a determined competitor of the great Hudson's Bay Co. in its own territory, and with ships and frontier stores is making a serious effort to obtain a portion of the Canadian fur trade. This firm does a wholesale and retail business, but offers no skins at auction. The Hudson's Bay Co. sells all its furs at public auction in London through the firm of G. M. Lampson & Co. The extensive buying of the American dealers in Siberia threatens to entirely nullify the importance of the Russian-Siberian fairs as fur marts.

"England maintains its position as the skin dyeing and dressing centre of the world, despite many attempts that have been made to wrest away this supremacy. The French, especially, were determined competitors and at one time had secured a fair share of the business. One of the leading dyers of Great Britain told me that five years ago the French business amounted to about 25 per cent. of the whole, and

its growth was a continual cause of alarm to those interested in the industry in England. The superiority of the English work has been ascribed to various causes, notably to some peculiar and unique property of the water used and to some secret processes and methods of handling. The fact that for many years one man enjoyed a practical monopoly of seal dyeing in England would appear to lend weight to the latter assertion.

"The following table shows the Lampson sales for March, June, and October, 1910. Prices are given in British pounds, shillings, and pence, the value in American money being approximately \$4.86, 24 1-3 cents, and 2 cents, respectively. The highest and lowest prices are per skin, except where indicated other wise.

Skins	MARCH			JUNE			OCTOBER		
	Number of skins	Highest price	Lowest price	Number of skins	Highest price	Lowest price	Number of skins	Highest price	Lowest price
		<i>s. d.</i>	<i>s. d.</i>		<i>s. d.</i>	<i>s. d.</i>		<i>s. d.</i>	<i>s. d.</i>
Badger.....	4,830	22 0	8 0	4,793	19 0	0 3	.....	.....	.....
Bear, black.....	4,290	155 0	2 0	1,694	135 0	1 3	2,008	110 0	2 0
Beaver.....	8,768	56 0	20 0	2,353	44 0	7 0	2,719	33 0	8 0
Cat.....	89,512	3 6	0 10	37,893	2 0	1 2	.....	.....	.....
Clivet.....	12,473	2 11	0 5	16,261	3 9	0 5	24,235	1 11	0 2
House.....	12,466	60 0	0 8	15,499	56 0	0 1	.....	.....	.....
Wild.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chinchilla:									
Bastard.....	1,820	700 0a	105 0a	1,825	980 0a	200 0a	2,995	975 0a	100 0a
Real.....	5,294	780 0a	85 0a	2,468	400 0a	65 0a	1,474	600 0a	475 0a
Ermine.....	105,985	310 0b	24 0b	25,005	400 0b	40 0b	28,560	320 0b	190 0b
Fisher.....	679	175 0	8 0	412	90 0	2 0	46	90 0	17 0
Fitch.....	817	5 9	0 3	7,180	6 0	0 7	.....	.....	.....
Fox:									
Blue.....	1,800	450 0	13 0	109	280 0	50 0	388	210 0	12 0
Cross.....	1,299	120 0	3 0	298	75 0	3 0	161	84 0	7 0
Gray.....	13,019	18 0	1 0	10,632	8 0	1 2	2,064	7 9	1 6
Jap.....	.....	.....	.....	15,224	18 0	1 0	12,210	8 6	0 10
Red.....	28,459	80 0	2 9	14,831	70 0	2 0	12,278	62 0	0 9
Red Australian.....	.....	.....	.....	11,174	10 0	0 4	24,341	11 0	0 1
White.....	2,697	90 0	10 0	2,561	80 0	3 0	4,221	70 0	3 0
Kangaroo.....	1,559	2 9	0 7	988	2 3	0 3	.....	.....	.....
Kolinsky.....	47,172	6 0	1 0	25,710	4 3	0 3	37,934	5 3	0 1 1/2
Lynx.....	301	165 0	8 0	675	140 0	3 0	872	125 0	6 6
Marten.....	11,345	180 0	75 0	2,847	130 0	6 0	.....	.....	.....
Baum.....	775	92 0	12 0	829	80 0	1 0	.....	.....	.....
Japanese.....	.....	.....	.....	9,373	20 0	3 6	2,247	16 6	6 0
Stone.....	2,854	28 0	4 6	2,046	32 0	2 0	1,012	22 0	3 2
Mink.....	82,987	66 0	0 8	23,460	46 0	0 8	12,513	130 0	3 0
Mole.....	169,618	30 0c	5 0c	.....	.....	.....	308,711	30 0c	5 0c
Musquash.....	651,164	0 64	0 3 1/2	627,440	0 50	0 2 1/2	478,444	0 42	0 34
Black.....	14,920	0 58	0 18	14,015	0 50	0 18	12,380	0 41	0 31
Opossum:									
American.....	321,860	4 8	0 0 1/2	77,302	11 0	0 4 1/2	28,982	4 7	0 6
Australian.....	452,165	21 0	0 10	293,309	16 0	4 0	606,264	11 0	0 4
Otter.....	3,888	260 0	56 0	4,992	145 0	3 0	3,600	100 0	3 6
Raccoon.....	174,225	31 0	0 3	74,256	23 0	0 2	9,882	19 0	2 3
Sable, Russian.....	6,574	610 0	6 0	1,462	280 0	5 0	1,945	360 0	4 0
Skunk.....	362,216	27 0	0 6	146,700	21 0	0 2 1/2	14,620	15 6	0 2
Squirrel backs.....	124,147	190 0c	17 0c	195,997	210 0c	34 0c	295,894	150 0c	5 0c
Wallaby.....	66,981	8 6	0 3	88,292	6 0	1 0	183,800	7 6	0 1
Wolf.....	22,617	65 0	0 3	17,871	50 0	0 6	3,728	30 0	0 5

aPer dozen.

bPer "timber," or 40 skins.

cPer 100.

Other Offerings

"There were 480 silver fox skins sold at the March, 1910, auctions, which brought £540 as the highest and £9 as the lowest price. In June 64 of these skins were offered, the prices ranging from £230 down to £5, and at the October sales 167 skins brought prices from £150 to £36.

"At the March Lampson sales, there were also offered 3,315 white hare skins, prices for which ranged from 5½d. to 4d.; 1,311 Persian lambskins, prices 23s. to 3s.; 307 sea-otter skins, prices £350 to £4; 763 bales of North American rabbit skins, prices 8d. to 3d. per pound; 689 fur sealskins (dry), prices 13s. to 2s. 6d.; 2,124 hair seal-skins (dry), prices 6s. 9d. to 1s.; 2,410 wombat skins, prices 2s. 11d. to 7d.; and 928 wolverene skins, prices 46s. to 4s. At the June auctions 200 brown bearskins brought prices varying from 90s. to 9s., and 4,100 marmot skins from 3s. 1d. to 1s. 9d.

"At the December seal auctions, 13,584 Alaska skins were offered in 1910, against 14,350 in 1909, and brought from 240s. to 80s., which was somewhat lower than in the earlier year. From the northwest coast came 12,589 skins, against 13,972 in 1909, the prices averaging a trifle higher in 1910 than in the preceding year and ranging from 168s. to 35s. Prices were 10 per cent. lower for South Sea skins, the number sold being 1,060 in 1910, compared with 2,086 in 1909, and the returns being 182s. for the finest quality and 78s. for lower grades. Cape Horn skins numbered only 213 in 1910, compared with 912 in 1909, but the prices, 58s. to 38s., were 25 per cent. higher.

"It will be realized that in the valuation of furs so much depends on size, condition, colour, age, district, etc., that a mere list of prices is no guide to the fluctuations of the auction-room value of the skins."

PRICES OF SILVER FOX SKINS

Annual Production Emil Brass, a German commercial agent, who, for thirty-five years, has been engaged in collecting statistics of the fur trade, states that the average number of fox skins produced annually in the period from 1907 to 1909 was 2,042,300. The following figures are based on his estimates:

COMMON RED FOX (<i>Vulpes vulpes</i>)	{ Red skins.....1,515,000 Cross skins.....18,000 Silver skins.....4,300
POLAR FOX (<i>Vulpes lagopus</i>)	{ White skins.....105,000 Blue "11,000
KIT-FOX (<i>Vulpes velox</i>)	}64,000
GREY FOX (<i>Urocyon cinereusargenteatus</i>)	}50,000

The Japan fox or Raccoon dog, and a few thousand skins of two South American species make up the balance.

Brass estimates the world's yearly production of the various species of foxes as follows:

FOX SKINS PRODUCED ANNUALLY

Continent	COMMON RED FOX			Kit-Fox	Gray Fox	POLAR FOX	
	Red	Cross	Silver			White	Blue
America...	200,000	15,000	4,000	6,000	50,000	30,000	6,000
Europe....	775,000					5,000	1,000
Asia.....	160,000	3,000	300	60,000		70,000	4,000
Australia...	30,000						

The quotations published by fur-buyers make a geographical classification of furs, thus:

Geographical
Classification

RED FOX NO. 1, LARGE:*

Alaska, Northern and Western Canada.....	\$12.00
Newfoundland and Labrador.....	8.50
Minnesota, Wisconsin, Dakota, Missouri, Michigan.....	7.50
Eastern Canada, Michigan, New York, and Northeastern states ..	6.00
Pennsylvania, New Jersey, Ohio, Indiana, and Illinois.....	5.00
All central and southern States.....	3.50

RED FOX NO. 1, LARGE:†

Eastern Canada, Nova Scotia, Labrador.....	9.00
Maine, Vermont, Massachusetts, Ontario.....	8.00
Northern New York, northern Michigan, Connecticut.....	7.00
Northern Pennsylvania, central New York, central Michigan....	6.00
Central Pennsylvania, northern Ohio, W. Virginia, N.Y.....	5.00
Central Ohio, northern Indiana, Illinois.....	4.75
Southern Pennsylvania, Delaware, Virginia, north Carolina, southern Ohio, northern Kentucky.....	4.50
Southern and Southwestern.....	4.25

The geographical classification reveals the fact that in North America the higher the altitude, or the lower the temperature, the heavier the pelt. Mink descends steadily in value from Labrador to Florida, Eastern Canada mink being quoted at \$7.50 in Nov., 1912, and Florida at \$4. A heavy pelt, if properly coloured, is usually the most valuable. Canada, therefore, produces the best fur in the New World as Russia does in the Old. It is quite possible, also, that the pelts of raccoon, opossum

**Fur News Magazine*, November, 1912.

†*Fur Trade Review*, December, 1912.



A COLLECTION OF 34 WILD SILVER-FOX SKINS, WORTH UPWARDS OF \$21,000

skunk and other animals not now found in northern Canada could be improved by domestication in colder regions. Ranch-bred animals properly kept will develop as heavy pelts as wild specimens, and they can always be killed when prime.

**Average Prices
of Silver Fox Skins**

The average price for all silver fox skins sold in London, including the wild stock and ranch stock, are as follows:

YEAR	AVERAGE PRICE
1905.....	\$146.59
1906.....	166.93
1907.....	157.11
1908.....	168.91
1909.....	244.12
1910.....	414.37
1911.....	290.01

The high average price obtained for silver fox skins in 1910 is accounted for by the better market. More than one half of the skins selling for £100 or more were from Prince Edward Island ranches.

At the present time, the average price of wild silver fox skins in London is about \$200 and, for ranch foxes such as are found with the best ranchers, \$1,200.

Wild silver fox are not always prime and they are frequently shot, chewed, mangled and poorly dressed, while ranches foxes are usually killed when their fur is in prime condition. The highest price ever paid at the London sales for a silver fox skin was £580. It is said that this skin was sold by a Paris firm which had bought it at a previous sale for £390, and that it was from a ranches fox from Prince Edward Island.

The next highest price was £540, and a half dozen have sold for £500 or more, all being from Prince Edward Island ranches. A rather remarkable sale was made in March, 1912, when a pelt from a fox that died in James Rayner's ranch at Kildare, P.E.I., on October 12, 1911, brought the highest price, £410, although the skin would not have been fully prime before December.

**Prices of
P.E.I. Skins**

It is a difficult matter to obtain authentic records of sales of silver fox skins from Prince Edward Island; farmers, as a rule, do not give careful attention to correspondence and records. Many reports are alleged to have been lost and those examined gave evidence of having been filed in an inside coat pocket for a considerable period. Documentary proof of sales made in London was also difficult to obtain. Below are reproduced the sales reports of Charles Dalton and J. S. Gordon for the year 1910:

G. M. LAMPSON & Co.

64 Queen Street,
London, E.C., 7th April, 1910

Account sale of FURS received on consignment
for account of C. DALTON, Esq., Tignish, Prince Edward Island.

C. D.	Invoice- Quantity	Lot	Skins			£	s.	d.
Mail 5 pcls. 2 " 5 " 2 "		2105	1	Fox, Silver		310		
		2106	1			530		
		2107	1			210		
		2110	1			160		
		2120	1			46		
		2149	1			280		
		2150	1			540		
		2151	1			310		
		2152	2		220	440		
		2153	1			430		
		2166	2		125	250		
		2194	1			340		
		2195	1			340		
		2196	1			200		
		2197	1			370		
		2200	1			165		
		2230	1			500		
		2231	1			270		
		2232	1			200		
		2233	1			280		
		2234	1			290		
		2242	2		210	420		

C. M. LAMPSON & Co.

64 Queen Street,
London, E. C., 7th April, 1910

Account sale of FURS received on consignment
for account of J. S. GORDON, Esq., Alberton, Prince Edward Island.
Prompt 7th April, 1910.

J.S.G.	Invoice Quantity	Lot	Skins			£	s. d.
		2109	1	Fox, Silver		490	
		2156	1			180	
per mail			—				
1 pcl.	2		2				
1 "							

A discount of 2½ per cent. off these prices is given and the selling commission of 6 per cent. and the carriage and insurance charges bring the total cost of marketing furs in London up to about 9 per cent. of the selling price.

Statistics for 1908 and 1909 are wholly lacking, the records being reported lost. Satisfactory proof was furnished that the following sales were made, although possibly not more than one-half the total quantity of skins sold in the period 1905-1912 are represented:

SALES OF P. E. I. SILVER FOX SKINS, 1905-1912

Year	No. of Skins	Total Value	Average Value
1905	11	\$ 5,937.33	\$ 539.76
1906	8	9,733.33	1,216.67
1907	28	22,892.80	817.60
1910	27	36,748.20	1,361.05
1911	10	10,852.67	1,085.27
1912	1	1,995.33	1,995.33
Total	85	\$88,159.66	

The average for the last seven years would probably be slightly lower if reports of all sales were available. On the other hand, the price has advanced since 1905, most noticeably so in 1910 and in 1912.

On account of the demand for breeding animals, but few skins have been sold since 1910.

No ranches other than those on Prince Edward Island have furnished proof of the prices obtained for skins produced by them. T. L. Burrowman of Wyoming, Ont., offered no documentary proof of his sales. The highest price he claimed to have received for a silver fox skin was \$1,050 and he admitted that the skin came from the vicinity of Labrador and hence belonged to the sub-species *V. bangsi*. Mr. Johan Beetz, of the North shore of the Gulf of St. Lawrence, sold his breeders at a much lower price than the Prince Edward Island ranchers. Messrs. Holt, Renfrew & Co., of Quebec, are holding all their best stock and selling only some inferior specimens to brokers or traders. They have made no test of the business as a fur-raising proposition and have not invested capital as freely as such intelligent and enterprising furriers would be expected to do if they thought they could rear the silver fox profitably. The other experiments in Alaska, Yukon and elsewhere are too recent to produce results.

Appendices

I. Value of Wild Animals*

BY

C. D. RICHARDSON, WEST BROOKFIELD, MASS.

THOSE beautiful wooded dells should be the haunts of the wild creatures, as when first discovered by the white man. Too long they, with their wild life, have been given over to the pot hunter and to him who would despoil them of their true charm. There is a growing recognition that the strain of modern life can be best endured by often fleeing to the wilds, which calls at times to all, but louder to some than others.

All over this great country of ours there are vast stretches of waste land, with their variety of woods, swamps, and hillside, which yield but little profit to the owner. Let us look a little into the future. Suppose we make something of this land, fence it in, reforest it, and stock it with game. It will require little care and the average farmer may realize from it more than he now does from his tilled acres. The fence problem is practically solved in the use of woven wire, and a large tract may be enclosed at a comparatively small expense.

The food problem, too, is a simple one, as grouse, pheasants, quail, etc., subsist almost wholly upon insects which, if unchecked, would destroy all vegetation, on noxious seeds, and on buds of unimportant trees, while the larger game animals, especially those of the deer family, feed almost wholly on twigs and leaves of vegetation which is of no real value, if not a menace to the farmer. In fact, the finest grazing ground for such animals is an old brush pasture in which the ordinary domestic animals would starve, but which furnishes to the wild creatures their most natural food.

The question of vermin—the fox, weasels, skunk, cat, etc., the natural enemies of the bird—must be considered and a systematic warfare waged against them. An English moor of from 100 to 500 acres often rents for £300 (\$1,500) a season, just for the shooting privileges of the grouse alone. When the vermin is disposed of, the increase in bird life on such a tract is simply enormous.

*From American Breeders' Association Annual Report, 1911.

There is a growing demand, at increasingly high prices, for live game to supply zoological parks, and for game as food. The revenue which may be derived from shooting privileges and from camping parties who would steal away to enjoy a season with nature, in all her fullness, may not be inconsiderable.

The national parks, whose value to the country cannot be over-estimated, are too far away for the average citizen to enjoy, but he may have that which will give much pleasure and profit nearer home. A tract of waste land of from 100 to 1,000 acres may be obtained in almost any section of the country, and especially in the hilly and mountainous regions, at a price within the reach of every alert farmer. The cost of fencing need not exceed \$1 a rod for an 8-foot fence, and the game for stocking—birds and small game will rapidly multiply under protection—can be procured at a price no greater than that paid for domestic animals.

One of the secrets of the success of the English race is in the fact that they as a people have emphasized out-of-door life. The rugged physique and robust health of the average Englishman are due to the fact that he is able to dismiss all care and enjoy a day with rod or gun. His large landed estates, together with the climatic conditions, offer favorable opportunities for all out-door sports. While we believe that large landed estates are a menace to the best interests of any people, yet, with our large acreage of waste land and democratic ideals, there is no possible danger that we shall ever suffer by the establishment of game preserves in this country. These game preserves may not only be centres from which the surrounding covers will be stocked, but they may be object lessons in forestry, of which this country stands in vital need, to say nothing of making rural life more beautiful and attractive.

II. Experience in Raising Virginia Deer*

BY

C. H. ROSEBERRY, STELLA, MO.

I KNOW of no other branch of the live-stock industry that returns as great a profit in proportion to the time, labor and capital invested as that of deer raising.

My experience is limited to the Virginia white tailed deer (*Cariacus virginianus*) and covers a period of 19 years. Doubtless, the raising of elk or wapiti would be equally profitable—perhaps more so where raised for venison, owing to the greater size.

A tract of 10, 20, or 40 acres of rough brush land, enclosed with a 6½ or 7-foot woven wire fence, with provision for a constant supply of water, either natural or artificial, is the chief requisite. It is better if there be dense thickets of underbrush, coarse weeds, and trees of pin oak, white oak, pig hickory, chestnut, etc. The twigs, leaves, and mast of these afford an abundance of natural food as well as shelter and seclusion.

It is also desirable to have a plat of three or four acres of tillable land on which to sow rye or wheat for winter pasture.

As the underbrush is gradually killed out, as it will be as the herd increases in numbers, unless the range is quite extensive, white clover and orchard grass may be sown for summer forage.

In the latitude of southwestern Missouri, feeding is not necessary between April 1 and November 1. For the rest of the year a stack of cowpea or clover hay to which the deer have free access, supplemented by a light ration of corn and bran or other mill feed in severe weather, is sufficient.

Do not feed too heavily of shelled corn. If gorged with it, the results are often fatal.

If it is desired to raise venison it is, of course, not necessary that the fawns be accustomed to handling while young in order to tame them. But if raised for sale as breeding stock, requiring that they be handled and shipped alive, it is necessary to take the fawns from the does when they are ten days old and raise them by hand on cow's milk.

This, of course, involves a great deal more trouble and expense than to let the fawn run with the doe; hence the price received for breeding stock is proportionately greater than that received for the venison carcass. For example, a yearling dressed for market may weigh 60 pounds net, and could be profitably sold for 25 cents a pound, or \$15; whereas

*From the American Breeders' Association Report, 1909.

the same raised by hand would be worth at least \$30 for a buck, or \$45 for a doe.

My method of raising by hand is as follows: A tract of 3 or 4 acres, free of underbrush, in which the fawns might hide, is fenced off from the main park. Early in May the does that are to drop fawns are confined in this small lot.

During the fawning time the lot is carefully searched at intervals of two or three days, and when a fawn a day or two old is found it is at once tagged by tying about its neck a strip of cloth—red if it is a buck or white if it is a doe—and allowed to remain with the doe ten days, when it is taken from the park and confined in a 5 ft. by 10 ft. cage made of one-inch poultry netting, lined inside with cloth and bedded with clean straw. A 5 by 10 cage will accommodate 12 fawns. The bedding must be kept dry and frequently changed for cleanliness. The cloth lining is necessary to prevent injury. The youngster is exceedingly wild at first and dashes himself against the sides of the cage in frantic efforts to escape.

If allowed to remain longer than ten days with the doe, it is often impossible to capture the fawn except by a chase or by strategy. The latter consists in biding your time until the fawn is found lying beside a log, stump, or clump of bushes, when it is very stealthily approached from the leeward to within springing distance and pounced upon before it can get to its feet. When other methods of capture fail, it may be run into a fish net in which it will become entangled.

The fawns remain in the cage for two weeks, during which time they learn to drink fresh milk from a bottle and become quite tame. They are then allowed the freedom of an enclosure 20 by 100 feet for two weeks longer, when they are given a still wider range. But they must not be returned to the park, else they will become wild again.

The adult Virginia buck, if raised by hand, often becomes vicious, especially during the rutting season, and should not be trusted until rendered comparatively harmless either by sawing off his antlers an inch above the burr or by bolting a 1 by 4 hardwood board 3 feet long across the tips of his antlers. The wild bucks never lose their fear of man sufficiently to attack him.

I would not advise beginners with small means to go into the business of deer raising too heavily at first. It is better to begin on a small scale, say 10 acres, and a herd of vigorous stock and let the business increase along with the increase of knowledge gained by experience.

Thousands of acres of rough land unsuited for cultivation that now brings its owner no returns for his investments may, by converting it into small deer farms, be made to yield the owners a handsome profit, as well as much pleasure.

III. Selected Articles from the Annual Report of the American Breeders' Association, 1908*

OBJECTS OF BREEDING WILD MAMMALS

EXPERIMENTS in breeding wild mammals need not necessarily be for their domestication. They may be bred in inclosures giving sufficient range and a habitat as nearly natural as circumstances will permit and the problem of ultimate domestication left for future determination. The chief objects to be sought by experiments in breeding wild animals are: (1) preserving species; (2) use in agriculture or transportation; (3) use for hides and fur; and (4) use as food.

Perpetuating Species.—Extinction of species is a process of nature, and from an economic point of view is not necessarily a misfortune to the world. But when the rapacity of man is turned against a useful species until it is threatened with extermination, there is good reason for the intervention of organizations of men for its preservation. The imminence of extinction for the American bison, the African elephant, the eland, the walrus, the sea otter, and other species is not imaginary. Within recent times a considerable number of birds have been lost to the world. Of mammals, the quagga and the blaubok (*Hippotragus leucophaeus*), the latter a small relative of the roan antelope, have been exterminated from the South African fauna. Foresight might have preserved them; and foresight accompanied by governmental intervention will be needed to prevent the loss of many of the large game mammals of the world. The preservation of the best of them is a sufficient reason for advocating the expenditure of money in experiments in breeding them.

Agriculture and Transportation.—Our second object in breeding wild animals seems to be less important. The horse will never be surpassed in general usefulness and the other animals used in agriculture and transportation are excellent in their places. Two animals, how-

*The Committee on Breeding Wild Mammals of the American Breeders' Association is composed of the following members:—

Dr. E. Lantz, Washington, D.C., Chairman.

M. M. Boyd, Bobcaygeon, Ont.
R. H. Harris, Clarksville, Tex.
Emory, E. Hoge, Baltimore, Md.

W. M. Irwin, Washington, D.C.
C. J. Jones, Topeka, Kan.
C. D. Richardson, Worcester, Mass.

Object: To investigate and report on the methods and technique of improving wild mammals; and to devise and suggest methods and plans of introducing producing and improving such wild animals as may be useful for the production of food, skins, etc., or as aids to agriculture.

ever, both of the African fauna, are good subjects for experiment in breeding and domestication for these uses—the zebra and the elephant. The zebra is the only animal of its kind that is apparently immune to the fatal effects of being bitten by the tsetse fly. The zebra is easily domesticated, but seems to lack endurance. If it can be crossed with the horse so as to produce a hardy hybrid also immune to tsetse fly, the problem of African transport would be partly solved. The domestication of the zebra and its improvements by judicious breeding are projects that are well worth the expenditure of money upon them. The African elephants have been domesticated and trained like their Asiatic relatives and have proved to be equally docile under careful management. There is little doubt that they could be made equally useful.

Breeding for Fur.—Investigation of the possibility of breeding fur-bearing animals profitably is especially desirable, in view of the failing supply of our better furs. As another committee has reported upon this subject, we do not take it up.

Breeding for Food.—From an economic standpoint we regard this as an important reason for attempting to breed wild mammals. Game of all kinds is becoming scarcer from year to year, and sportsmen go farther and farther in search of it. Even after it is found, the laws upon the subject of sale and export of game often prevent the hunter from carrying to his home or disposing of game that has been lawfully killed. In our zeal to protect our vanishing game mammals and birds, we have in some cases, carelessly passed laws which, if not modified, will prevent the one movement that would do more for game preserving than any other agency that can be contrived. We refer to game propagation carried on not by the State alone, but by private enterprise as well.

EXOTIC SPECIES RECOMMENDED FOR BREEDING UNDER DOMESTICATION

The breeding of exotic species of the deer family is a promising field for experiment. The red deer and fallow deer of Europe have been successfully acclimatized in many parts of the world. It has been shown that the small Chinese water deer and the Indian muntjac are both suited to European deer parks and no doubt both would thrive in America. The water deer are noted for their fecundity, the female producing three or four young at a time. The muntjacs usually produce twins. The flesh of both is said to be excellent. These small deer are less than 20 inches tall at the withers and, if domesticated in our Southern States, would furnish farmers a much needed form of meat which could be provided fresh every day or two as needed. Aside from fowls, most

of our domestic animals are too large for immediate consumption by the ordinary farmer's family; and there is a distinct demand for a food animal of smaller size than the sheep for farm use. Some of the smaller African antelopes, as the red duiker, might perhaps be made to supply the demand.

In Africa there are nearly a hundred species of the antelope family, many of them hardy and some of them producing the best of venison. More than a dozen species would be promising subjects for experiments in acclimatizing and breeding in America. Some of them for instance, as the gazelle, undoubtedly would be found especially adapted for the arid range country of the Southwest and might be used to restock parts of the country from which the American antelope has disappeared.

The eland is the largest of the antelope family and is threatened with extermination in South Africa. The average weight of this animal is from 800 to 1,100 pounds and old males sometimes attain 1,400 to 1,500 pounds. The eland has often been recommended for experiments in domestication. It was first introduced into Holland in 1783 by the Prince of Orange. It was acclimatized in England by the Earl of Derby in 1842 and was bred successfully in his parks. At his death his herd passed into the possession of the London Zoological Society in 1851, and continued to increase in numbers for many years. In 1879, the Duke of Bedford had a fine herd of 14 elands in his park at Woburn Abbey. The flesh of the eland is highly eulogized by Harris the African traveller in these words: "Both in grain and colour it resembles beef, but it is far better tasted and more delicate, possessing a pure game flavour and exhibiting the most tempting looking layers of fat and lean, the surprising quantity of the former ingredient with which it is interlarded, exceeding that of any other game quadruped with which I am acquainted. The venison fairly melts in the mouth, and as for the brisket, that is absolutely a cut for a monarch."

Besides the eland, the sambar, the nilgai, and other foreign deer have given promising results when bred in enclosures. All told, there are perhaps 150 species of exotic *ungulata* useful for food, that might become promising subjects for experiments in acclimatizing and breeding in the United States. The cost of introducing and caring for ten or more of each species until acclimated would be small when compared with the important results that would follow success with even a very few species.

For those who would engage in growing deer for profit, however, we can recommend in preference to exotic species our native elk, or wapiti, and the Virginia deer. They need no acclimatizing and are, without question, adapted for propagation in this country.

BREEDING OF THE WAPITI, OR AMERICAN ELK

Although our native wapiti is less prolific than the Virginia deer, and some other species that have been bred in parks, it makes up for this circumstance in hardiness and ease of management. It has been successfully acclimatized in England and on the continent, where it has been crossed with both the Altai wapiti of Asia and the red deer of Europe. Both crosses with the American species have improved the stock in size and general stamina.

The wapiti has been successfully bred in many sections of the United States and affords one of the best subjects for experiments in breeding for profit. While the old males are apt to become dangerously vicious during the rutting season, making them somewhat undesirable for open parks, they are ordinarily docile and have often been trained to harness and driven in public. Under careful scientific management with possibly careful dehorning, the elk would in a very few generations develop into a gentle race of a true domesticity.

Judge John D. Caton, of Illinois, who during his lifetime contributed much to our knowledge of the deer family and of their susceptibility to domestication, was apparently unfortunate in having enclosures poorly adapted to deer. He believed that they contained some kind of vegetable food that was harmful to most of the species; but his herd of elk was always healthy. Writing in 1880, Judge Caton said:

"My elk continue to do well and are so prolific that I have had repeatedly to reduce their numbers and would be glad now to dispose of at least thirty. I have on an average about one old buck a year killed in battle and sometimes another by some casualty, but all appear healthy. Mine grow very large and of all the *cervidae* they seem best adapted to domestication."

Your committee has recent reports from a number of breeders of elk, all of whom seem to confirm the opinion advanced by Judge Caton as to the success of breeding the elk in preserves.

Joshua Hill, of Pontiac, Mich., has a preserve of 300 acres in which he has been breeding elk and buffalo. Although not breeding animals for commercial purposes, he is of the opinion that elk, on account of their superior hardiness, could be more profitably handled than deer. He has heard of elk meat bringing from 50 cents a pound upward, and thinks that the business of growing animals for market might be made to win if properly pushed.

Isaac Bonine, of Niles, Mich., breeds both elk and Virginia deer, and has had thirty years' experience. He prefers elk because they require less care than deer. Elk winter well on hay and corn fodder with a small amount of grain and thrive in summer on blue-grass pasture. While deer do reasonably well on the same food, they thrive better when fed vegetables and in that latitude require some sort of winter shelter. An elk requires no shelter. While Judge Bonine has doubts as to the profit of growing deer and elk for the venison, he thinks that breeding them for park purposes can be made very remunerative. He has a number of elk for sale.

G. W. Russ, of Eureka Springs, has a herd of 34 elk. They have abundant range in the Ozarks on rough lands covered with hardwood forest and abundant underbrush. He reports that the animals improve the forest by cleaning out a part of the thicket. Fully 90 per cent. of the females produce healthy young, and Mr. Russ thinks he could make the business of growing elk for market profitable, if the law would permit him to kill and export domesticated elk. He has an offer of 40 cents a pound for the dressed carcasses in St. Louis. He thinks that large areas now unutilized in the Alleghanies and Ozarks might be economically adapted to produce venison for sale and he regards the elk as especially suited for forest grazing. They should have about twice as much range as the same number of cattle.

J. W. Gilbert, of Friend, Neb., has been raising deer and elk for seventeen years. He has at present 30 deer and 16 elk on prairie pasture. He regards elk as the more profitable and has never had a barren cow elk.

T. J. Wilson of Lewisburg, Ohio, began raising deer and elk a few years ago, with three head of each at the start. He has not succeeded so well with deer as with elk. Deer require a higher fence and more care. Elk do well on hay, corn fodder, and rough feed, and if they escape from an enclosure may be driven back like cattle. He originally paid \$165 for two adult elk and a fawn. He has sold \$300 worth of stock and has now a herd of 12, worth a thousand dollars.

Your committee has the names and addresses of about a dozen other successful breeders of the American elk, but the time at our disposal did not permit our obtaining particulars of their experience.

BREEDING THE VIRGINIA DEER

Testimony as to the hardiness of the Virginia deer and the profits of breeding them is not so unanimous as it is concerning the wapiti; but the general opinion is that with suitable range, plenty of good water, and reasonable care in winter, the business of growing the animals for

stocking parks and for venison may be made as profitable as that of any other live-stock industry, and that untillable land may be utilized as preserves for the animals.

Mr. R. H. Harris, a member of this committee, who resides at Clarksville Texas, was requested to contribute his views upon the raising of deer as an industry. He writes as follows:

"Having been actively engaged in this business for some years, I feel qualified to speak on the subject with clearness and conviction. I find that the Virginia deer is adapted to almost every section of the United States. It fawns in May or June of each year, each doe usually bringing two young. The young mature rapidly. Virginia deer are the most beautiful, graceful and healthful animals known. No other meat is equal to venison as a diet for the sick, it being easily digested and agreeing with the most delicate stomachs. The demand for both venison and skins is unlimited. The flesh, being in wide demand in cities, especially in restaurants and cafes, is very high-priced.

"These deer are easily tamed; the wildest fawns, if taken from the herd when young, will in a few hours become as gentle as a pet dog. I have for several years been raising them in large numbers. They run at will in woodlands and fields, are never handled, but fed occasionally, and are as gentle as a herd of common cattle. They are easily and cheaply raised and seldom, if ever, die from natural causes. After years of practical experience, I unhesitatingly state that the raising of deer is in profitableness second only to the raising of cattle.

"The cost of feeding deer averages about one-half cent each per day. They feed on all kinds of vegetables, buds, and leaves of trees, growing wheat, clover, peas, barley, oats, etc. Cotton seed is also a very cheap and satisfactory food for them. They also eat corn, bran, fruits and, in fact, anything that man or beast will eat, except dry hay. They live from twenty to twenty-five years. They are easily confined by a woven wire or barbed wire fence 6½ feet in height.

"I strongly urge this Association to appeal to our government to protect and encourage the industry of deer raising, believing it to be one of the most profitable and practicable industries now in prospect for our people. It is unnecessary to urge the need of quick and energetic action, for this noble animal is fast disappearing and is without adequate protection. Its extinction would eliminate from our continent what ought to be an industry equal in value to the raising of cattle, hogs, or sheep; and I would urge upon this Association the importance of securing legislation that will permit the marketing of domesticated venison at all seasons of the year....."

In conclusion your committee would again urge upon this Association such action by resolution as will give emphasis to our desire that State legislatures should so modify their laws as to permit the marketing, under needed regulations, of venison or live deer reared in preserves stocked and maintained at private expense.

REPORT OF THE COMMITTEE OF THE AMERICAN BREEDERS' ASSOCIATION ON BREEDING FUR-BEARING ANIMALS*

WHAT HAS BEEN DONE

The possibility of breeding many species for their fur has not been overlooked and spasmodic efforts along this line have been made in various parts of the country for generations. Almost every fur-bearing species has been the subject of experimentation. Fox and skunk farming has attracted most attention, but mink, marten, otter, beaver, and muskrat have come in for a fair share. The field has proved most alluring, as with pencil and paper any sanguine person can in a few minutes figure out a large fortune in fur at the market price and well known normal rate of increase of a given species of mammal. Again and again it has taken years of work and the expenditure of thousands of dollars to prove that important factors have been omitted in the computations. One well-organized company in Pennsylvania sank \$25,000 in three years, only to prove that skunks would eat their young when in close confinement. Skunk farming, however, has, in some cases, proved a partial success, but "Why raise one-dollar skunks instead of thirty-dollar marten?" is a question asked by Mr. E. T. Seton, a member of the present committee.

The nearest approach to success in fur culture has been on the native range of species, where, owing to favourable conditions, protection could be afforded and the animals allowed to multiply until a profitable yield of fur was secured. This method has been especially applied to blue foxes, beavers, and muskrats, and with considerable success. It merits every possible encouragement; but in most cases there has been little attempt at domestication and nothing gained by way of permanent control of breeds of valuable fur bearers. In fact there seems to have been no systematic attempt to develop a domestic breed of fur-bearing animals. Most of the experiments have been in

*Annual Report, 1898. The objects of this committee are: To investigate and report on possibilities, methods and technique of breeding fur animals; and to encourage experiments in the production and breeding of fur animals.

raising wild animals for fur, and these have usually ceased while the animals were still wild. The fur crop has been expected at once and has usually been the sole object of the experiment.....

PROMISING SPECIES

In spite of numerous failures there is no reason to doubt the entire practicability of successfully breeding in captivity almost any species of fur-bearing mammal. In most cases it will take considerable time to bring about the complete domestication and adaptation desirable; but the object is of ample importance to warrant the necessary expenditure of time and money. It is not necessary nor advisable to start on a large scale, as the requirements of each species must be studied and worked out slowly.

In selecting species for breeding purposes the first important consideration should be to secure a permanently valuable fur. The fancy prices paid for sea otter and black and silver foxes, reaching \$1,000 and even \$2,000 for some choice skins, are based in part on the rarity of these animals, and would not be maintained if a large supply became available. Still these skins will doubtless always be among the most valuable. Owing to their pelagic habits, however, the sea otter and fur seal need not be considered in the present connection.

The fur of each species varies greatly in colour, quality, and value in different parts of its range. The choicest natural strains should, if possible, be selected to start with; but these can doubtless be bred into later if a domestic breed be established.

The North American species promising most valuable results in fur culture are as follows, in sequence of greater permanent fur value: (1) black and silver foxes; (2) blue or arctic fox; (3) otter; (4) marten, or American sable; (5) beaver; (6) mink; (7) fisher. Cheaper kinds of fur, such as skunk, muskrat, raccoon and opossum, may under special conditions yield paying returns, but need not be considered at present. Many exotic mammals are worthy of consideration, but in general they do not offer any advantages over our native species and have the disadvantage of not being acclimated.

BLACK AND SILVER FOXES

The black and the silver foxes are merely melanistic and partially melanistic individuals of the red fox. Both owe their value in part to their rarity; but it will be long before artificial production will seriously affect the price. In habits and requirements they are iden-



T. R. H. DUKE OF CONNAUGHT AND PRINCESS PATRICIA IN SAINT PATRICK RANCH

tical with the red fox, of which they are in some cases the offspring. Still either the black or silver if mated together usually breed true. The cross fox is merely a dark form of the red with considerably more valuable fur. By selecting the darkest individuals to breed from and continuing the selection an increasingly valuable strain doubtless could be obtained.

Foxes taken when young and carefully raised in captivity become tame and usually breed if properly paired. The red foxes as well as the Arctic or blue fox are evidently strictly monogamous.....

BLUE OR ARCTIC FOXES

Many of the islands in Alaska have been leased or taken possession of for fox farming. Some of these islands were already inhabited by blue foxes and others were stocked with them, mainly from St. George Island, where the best fur was found.

As shown by the report of the Harriman Alaska Expedition, Vol. II., p. 357, 1901, and by a more recent account in *Forest and Stream* for July 26, 1906, by T. E. Hofer, these foxes are thriving and yielding considerable fur. On some islands they secure their own food and are merely guarded and trapped by those in charge. On most of the islands, however, they are fed for part or all the year, but their wild life has undergone little or no change. They appear to be naturally rather tame and with proper care could doubtless be thoroughly domesticated.

They breed when a year old, pair for breeding and have usually four to eight young at a litter. Prime skins are quoted at \$20 to \$25.

OTTER

Few wild animals thrive better in close confinement than otter. Given a small pen with a pool of water they seem comparatively contented and happy. They become very tame and are playful and intelligent. There are many accounts of their being so domesticated as to follow their master, come at his call and even catch fish and bring them out of the water for him. They are not easily trapped, and are quite able to hold their own against the encroachment of civilization. They probably are as common to-day near the district of Columbia as they are over most of their range, which reaches from Florida to Alaska. They can be readily enclosed by a simple wire-mesh fence taking in a section of a stream. They do not climb or burrow to any extent. Their

favourite food is fish and crustaceans, and suitable places could be selected where these could be procured in abundance.

Prime otter skins from eastern Canada, where the fur is at its best, are quoted in the January 1908, *Fur Trade Review* at \$15 to \$20.

BEAVER

In spite of more than three hundred years of persistent trapping a few beaver remain scattered here and there over a large part of the United States and Canada, probably enough, could they be adequately protected, to restock most of the streams. In many sections they are protected locally and are becoming abundant again.

If unmolested for a few years they lose their fear of man, work on their dams and houses in the day time and become comparatively tame. With such an animal further domestication seems unnecessary. Given a suitable pond or stream they find abundance of food and are able to care for themselves in every way. They can be fenced in as readily as a flock of sheep and their enemies, except man, can be fenced out. Thousands of miles of forest marsh and stream, fit for no other purpose are lying idle and could be used to advantage as beaver farms.

Prime beaver skins from the northern United States and Canada are quoted in the January, 1908, *Fur Trade Review* at \$5 to \$8.

By selecting breeding stock from the region where the fur is the best and keeping only the choice individuals for breeding purposes, it would doubtless be possible to steadily improve the standard and value of the beaver fur.

MARTEN

The marten or American sable is a forest animal of the Boreal zone. It comes into the United States along the Northern border and extends south in mountainous sections as far as New York, New Mexico, and central California. It is a beautiful, soft-furred little animal the size of a mink, but of much brighter appearance. It generally inhabits coniferous forests, is an expert climber, but avoids the water. Its food is mainly squirrels, rabbits, mice, birds, and such small game. In the wild state it has the savage disposition of its family, but in captivity is quiet and gentle.

The most valuable marten skins come from Labrador and eastern Canada and are variously quoted at \$20 to \$40.

MINK

The mink is one of the most widely distributed fur bearers of North America and one of the few species able to hold its own against

persistent trapping. It is almost as common to-day in the thickly settled sections of the country as in the most remote wilderness. A half-hour's run on a bicycle to the creeks in the suburbs of Washington will enable one to find mink tracks.

Wild mink when taken young become perfectly tame and are gentle and affectionate pets. They breed readily in captivity, are hardy, easily enclosed and seem not to worry over confinement. They are fond of the water, are expert swimmers and divers and get much of their food from streams and lakes in the form of fish, frogs, and crustaceans. They also climb trees and are at home in the forest.

There are numerous instances on record of "mink farms", or "minkeries," that have proved successful, but the low price of mink fur for many years has discouraged the industry. A few years ago mink skins sold at \$1 to \$2, but they are now quoted at \$5 to \$8. As other choice furs decrease in abundance there seems every probability that mink fur will hereafter increase rather than decrease in value.

With no other species is success in fur raising so simple and well tested. The value of mink fur varies greatly with different parts of the country, being least in the southern sections and greatest in the north-eastern States and eastern Canada.

RULES FOR HANDLING FUR ANIMALS

A few general rules apply equally well to all species.

At first the animals should not be taken away from their native climatic conditions, at least not from their natural life zone. As a general rule the colder the climate the better the fur, and healthier the animals. This does not mean that all the fur raising should be in the far north. Mountain areas, extending south even into many of the Southern States, offer unusual advantages in the close proximity of sections with warm and cold climates.

A thorough knowledge of the native food and breeding habits of a species should be made the basis of care in captivity. This is of the greatest importance at the start, though later on the animals may be able to adapt themselves to greatly modified conditions.

Sufficient room is necessary for the animals to keep themselves clean and obtain exercise and healthy occupation. Quiet and freedom from excitement and nervous strain are essential. Also constant familiarity and association with one or more suitable keepers.

CONCLUSION

The committee believe (1) that any experiments to be of value must be continuous for sufficient length of time to establish permanent

and improved breeds of fur-bearing animals; (2) that under proper management such experiments should result in developing an industry of great practical value to the people of North America; (3) that to insure success those in charge of the experiments must be thoroughly familiar with the habits of wild animals, and the keepers, or those in daily intercourse with the animals, must have the rare quality of sympathetic understanding of animal natures.

IV. Reindeer Progress in Alaska*

BY

LILLIAN E. ZEH

THE herding and breeding of domesticated reindeer, introduced as an experiment a number of years ago with animals imported from Siberia by the government, has now become the most prominent feature of the industrial education of the Eskimo and the main activity of many native villages of Arctic Alaska. The progress in civilization that has been made by lifting up the natives formerly living as savages, and eking out a precarious existence by hunting with no other domestic animal than the dog, to the estate of civilized, self-supporting herds-men, as accomplished through the reindeer industry, is a remarkable educational achievement. The Alaska Reindeer Service has now reached its most successful stage, as it marks the beginning of the period of full utilization of all the reindeer owned by the Government for the benefit of the native population.

At the present time there is hardly a surplus Government reindeer north of the Kuskokwim river. This has been made possible by the establishment of new reindeer stations, the employment of more natives as chief herders, by accepting the largest practical number of apprentices, and by transferring reindeer to both chief herders and apprentices in lieu of salary or supplies, the chief aim and fundamental policy of the Government being to turn the reindeer over to the natives as rapidly as they learn the industry and appreciate its value. The total number of reindeer in Alaska at the last census was nearly 23,000, and of this number over 11,000 are owned by the natives. One of the most striking and gratifying features is the large income which the natives derive from the sale of reindeer products, their share for the past fiscal year having been over \$18,000. This amount does not include the value of the reindeer skins used for clothing, nor that of the meat consumed as food. These material benefits and the very considerable income thus derived demonstrate the fact that the reindeer industry has become one of the most prominent factors in the economic life of the Eskimo.

The total number of Alaskan reindeer is distributed in herds among twenty-eight stations, eighteen of these being owned by the Government and ten by church missions. The Lapps own over three thousand. The natives are very anxious to get deer and look upon them as a safe

*American Forestry, January, 1913.

investment for their earnings, and usually take deer in preference to cash for services, when an opportunity is offered. The Government does not sell deer, this is done by natives and missions alone. The various missions are furnished a herd of one hundred deer on loan for a period of five years by the government. At the end of this time the original number must be returned. The mission keeps the increase of fawns, which amount to several hundred, derived from the Government loan. The Moravian mission of Bethel has one of the largest herds, nearly three thousand. Other missions having over one thousand deer, all in Arctic Alaska, north of the Yukon, are located at Colovin, Kotzebue, Shishmerof, and Cape Wales. At point Barrow, latitude $71^{\circ}25'$, the most northern point on the American continent, there is a herd of 300. The total population here is about 400, men, women and children. One native, "Takpuk," is considered the richest man of that region as he owns a herd of 137 reindeer. The missions support and educate a number of young apprentice herders.

The native herders also take on apprentices and award them six deer a year in payment for their services. The Laplanders take a loan of deer for five years from the Government and give their services as instructors for that period. At the end of five years the Lapp returns the 100 deer and becomes an independent herder himself with the large increase of reindeer he has obtained from the herd. The Lapp herders are not interested in the extension of the reindeer among the natives. Some of the largest owners of deer are Lapps, some half dozen of these men having accumulated herds of from five to nearly eight hundred.

In introducing the reindeer as a means to promote the industrial life and to provide a permanent livelihood for the Eskimo, it has been found necessary by the Government to put the young natives through a course of training. Those who get their deer directly from the Government serve an apprenticeship of five years. There are several hundred of these at present. They are bound by a written contract, the strict terms of which they cannot violate without peril of losing their annual allotment of reindeer and suffering discharge from the service. This caring for, training, and breeding the deer is an education in itself, and the best which the Government could give to the young natives. With careful training the Eskimo boys make excellent herders. They readily learn how to take care of the reindeer, to throw the lasso, to harness and drive the deer, and to watch the fawns. Siberian herders were first imported to teach them; but of late the more intelligent and efficient Laplanders, who have learned by centuries of experience the breeding of reindeer, were secured. The Eskimo boys take quickly to

some phases of the work, and in some respects excel the Lapps; they can lasso better than the Lapps, and many become expert in making harness and sleds. The minding of the herd requires constant vigilance, especially in the spring during the fawning season. Then the herders have to keep watch day and night by turns with rifle to protect the herd from the ravages of the Arctic wolf and the dogs.

In the ear of each Government deer a little aluminum button is fastened securely, and all private owners and herders have a mark which must be registered with a local Superintendent of the Reindeer Station and also at Washington. Besides being taught the art of deer-manship the apprentices are instructed in keeping accounts, the methods of marketing reindeer, and in other practical matters connected with the industry. No apprentice can become a herder unless he is proficient in the branches of elementary reading, arithmetic, and writing. At the end of his apprenticeship the young Eskimo native is allotted a number of deer by the Government, and with the increase obtained during the interval of his five years' service, each apprentice will have on an average, a herd of fifty reindeer. As this herd will double itself every three years, the graduate apprentice will have a herd which will afford and assure a self-supporting income quite enough to satisfy the economic wants of himself and family in the future. He is thus established in business by the Government and is given free pasturage thereafter. The reindeer produces one fawn in the spring each year for ten years.

Among the useful and profitable products of the reindeer are the skins for clothing. Of these pelts most varied use is made. From them are fashioned the tight-fitting trousers and that wonderful outer garment, the 'parka', universally worn in winter by both male and female natives and by many whites. The 'parka' extends to the knees and has a close-fitting hood, which keeps the head and shoulders comfortably warm even in the severest weather. These reindeer garments are remarkable for their excellent qualities of resisting moisture and cold. A close examination of the hair of reindeer furnishes an explanation of its peculiar value. The hair is not merely a hollow tubular structure, with a cavity extending throughout its entire length, but is divided, or partitioned off, into exceedingly numerous cells, like watertight compartments. These are filled with air, and their walls are so elastic and at the same time of such strong resistance that they are not broken up either during the process of manufacture or by swelling when wet. The cells expand in water, and thus it happens that a person clad completely in garments made of reindeer wool does not sink when in water, because he is buoyed up by the air contained in the hundreds of thousands of hair cells.

As a mineral industry continues to grow in Alaska the natives and graduate apprentices can earn high wages as teamsters, hauling supplies and furnishing fresh reindeer meat to mining camps in the interior, at points remote from railway and steamboat transportation. Well trained sled deer have been used to carry the mail 650 miles from Point Barrow, south to Kotzebue. This is the most Northern mail route in the United States, and likewise the most perilous and desolate mail trip in the world. Two trips are made a year and \$750 is paid for each journey. The average speed is about 40 to 50 miles per day, keeping up a steady trot.

One of the latest and quite remarkable feats showing the capacity of the reindeer for sledge driving was that accomplished by Mr. W. T. Lopp, the Superintendent of the Government Reindeer Service. During the recent winter's tour of inspection, Mr. Lopp travelled more than 2,500 miles with a reindeer sled over the frozen tundra and ice-bound rivers of the lower Bering Sea region from the middle Yukon to the coast of the North Pacific. Part of this route for several hundred miles lay through a country which had been so little traversed that not even native trails had been made. The Alaska Reindeer Service is under the direction of the United States Bureau of Education.

V. Canadian Legislation Respecting Fur-Farming

NEW BRUNSWICK

AN ACT RELATING TO FOXES AND OTHER FUR-BEARING ANIMALS KEPT IN CAPTIVITY

WHEREAS, certain persons in the Province of New Brunswick have engaged in the business of raising or breeding foxes and other fur-bearing animals kept in captivity, and it is desirable to protect the said animals from being disturbed by strangers or persons other than the owner or keeper of said animals;

Be it therefore enacted by the Lieutenant-Governor and Legislative Assembly, as follows:

1. Every one is guilty of an offence and liable to the penalty hereinafter provided who at any time hereafter, in any part of the Province, without the consent of the owner or caretaker of a ranch or enclosure where foxes or other fur-bearing animals are kept in captivity for breeding purposes, shall approach or enter upon the private grounds of the owner or owners of the said animals within a distance of twenty-five yards from the outer fence or enclosure within which the pens or dens of the said animals are located and upon which said fence, notices forbidding trespassing on the said premises are kept posted so as to be plainly discernible at the said distance of not less than twenty-five yards.

2. Any person convicted of an offence against Section 1 of this Act shall be liable to a fine of not exceeding \$50.00, nor less than \$5.00, and in default of payment of such fines to imprisonment for a term not exceeding three months, nor less than one month.

3. Every one is guilty of an offence and liable to the penalty hereinafter provided who at any time hereinafter, in any part of the Province, without the consent of the owner or caretaker of any enclosure within which foxes or other fur-bearing animals are kept for breeding purposes, and on the outer fence of which enclosure are kept posted notices forbidding trespassing on the premises where the said animals are kept, and plainly discernible at a distance of not less than twenty-five yards therefrom, shall pass within the said fence of such enclosure or climb over, break or cut through the same for the purpose of entering the said enclosure.

4. Any person convicted of an offence against Section 3 of this Act shall be liable to a fine not exceeding \$100.00 nor less than \$50.00, and in default of payment of said fine to a penalty not exceeding six nor less than two months.

5. Any person may kill any dog which he finds lurking about any enclosure in which are kept foxes or other fur-bearing animals for breeding purposes, and annoying or terrifying said animals, or any dog giving tongue and terrifying the animals so kept enclosed, or any dog which he finds straying or being upon his or her property on which are kept enclosures of foxes or other fur-bearing animals of which he or she is the caretaker; provided, however, that no dog so straying, lurking or being on the premises above herein referred to, when muzzled or accompanied by the owner or person having charge or care of such dog, shall be so killed unless there is reasonable fear or apprehension that such dog, if not killed, is likely to annoy or terrify the said animals within the said enclosures.

6. The provisions of Chapter 123 of the Consolidated Statutes of New Brunswick, 1903, relating to Summary Convictions, shall so far as applicable and not inconsistent herewith, apply to all prosecutions and proceedings under this Act.

QUEBEC

AN ACT RELATING TO FOXES AND OTHER FUR-BEARING ANIMALS KEPT IN CAPTIVITY

WHEREAS certain persons in the Province of Quebec have engaged in the business of raising or breeding foxes and other fur-bearing animals kept in captivity;

Whereas it is desirable to encourage this industry, as well because of the diminishing supply of our most valuable furs, as of the rich source of profit which this industry has proved itself to be in some of the sister provinces;

Whereas it is essential to the successful breeding of these animals in captivity that they should be protected from disturbance by strangers, or persons other than the owner or keeper of the said animals;

Therefore, His Majesty, with the advice and consent of the Legislative Council and the Legislative Assembly of Quebec, enacts as follows:

1. Every one is guilty of an offence and liable to the penalty hereinafter provided who at any time hereafter, in any part of the Province, without the consent of the owner or caretaker of a ranch or enclosure where foxes or other fur-bearing animals are kept in captivity for breed-

ing purposes, shall approach or enter upon the private grounds of the owner or owners of the said animals within a distance of twenty-five yards from the outer fence or enclosure within which the pens or dens of the said animals are located, and upon which said fence or enclosure notices forbidding trespassing on the said premises are kept posted, so as to be plainly discernible at the said distance of not less than twenty-five yards. No offence will be committed, however, by any neighbouring proprietor or occupant who approaches within such distance in the execution of work recognized or imposed by law or by municipal by-laws.

2. Any person convicted of an offence against Section 1 of this Act, shall be liable to a fine not exceeding fifty dollars nor less than five dollars and in default of payment of such fine and the costs to imprisonment for a term not exceeding three months nor less than one month.

3. Everyone is guilty of an offence and liable to the penalty hereafter provided who at any time hereafter, in any part of the Province, without the consent of the owner or caretaker of any enclosure within which foxes or other fur-bearing animals are kept for breeding purposes, and on the outer fence of which enclosure are kept posted notices forbidding trespassing on the premises where the said animals are kept, and plainly discernible at a distance of not less than twenty-five yards therefrom, shall pass within the said fence or such enclosure or climb over break or cut through the same for the purposes of entering the said enclosure, or for any other purpose whatever.

4. Any person convicted of an offence against Section 3 of this Act shall be liable to a fine not exceeding one hundred dollars, nor less than fifty dollars and in default of payment of said fine and the costs to a penalty not exceeding six nor less than two months.

5. Any caretaker may kill any dog wandering in the neighbourhood of any enclosure in which foxes or other fur-bearing animals are kept, and there giving tongue or otherwise terrifying such animals, provided, however, that the dog so killed is neither muzzled nor accompanied by the owner or by a person having charge or care of such dog.

6. Every infringement of any of the provisions of this Act is punishable summarily upon prosecution before a justice of the peace having jurisdiction in the district in which the offence was committed.

7. The provisions of Part XV of the Criminal Code respecting summary convictions shall, unless incompatible, apply to all prosecutions brought, tried and decided under this Section.

8. This Act shall come into force on the day of its sanction.

VI. Statistics of Fur Production

AVERAGE ANNUAL FUR PRODUCTION BY CONTINENTS*

By E. Brass

NORTH AMERICA

Lynx and Wildcat.....	90,000
House Cat.....	80,000
Timber Wolf.....	8,000
Prairie Wolf.....	40,000
Red Fox.....	200,000
Silver Fox.....	4,000
Cross Fox.....	15,000
White Fox.....	30,000
Blue Fox.....	6,000
Gray Fox.....	50,000
Kit Fox.....	4,000
Hudson Bay Marten.....	120,000
Fisher.....	10,000
Mink.....	60,000
Weasel (Ermine).....	400,000
Wolverene.....	3,000
Badger.....	30,000
Skunk.....	1,500,000
Civet Cat.....	100,000
Otter.....	30,000
Raccoon.....	600,000
White Bear.....	400
Black Bear.....	20,000
Brown Bear.....	3,000
Grizzly Bear.....	1,200
Marmot.....	30,000
Beaver.....	80,000
Muskrat or Musquash.....	8,000,000
Opossum.....	1,000,000
Hare.....	200,000
Musk-ox.....	500
Average production, [about.....	\$24,000,000

The average value of the fur produced annually in the other continents is estimated as follows:

South America.....	about	\$ 2,000,000
Australia.....	"	6,000,000
Europe.....	"	24,000,000
Africa and Oceania.....	"	2,000,000
Asia.....	"	26,000,000

*Estimated on the basis of production of the three years, 1907-1909.

APPROXIMATE AVERAGE YEARLY PRODUCTION OF THE WORLD'S
FURS IN THE THREE YEARS, 1907-1909

By E. Brass

The value of the world's production for each year amounts to 360,000,000 marks (\$95,680,000), of which furs to the value of 160,000,000 marks come to Leipzig each year.

Skins used by the natives and hunters for supplying their own requirements are not included.

BEARS

White bear:

Polar regions, Asia and Europe, 600; America, 400.

Grizzly bear:

America, 1,200.

Brown bear:

America, 2,000; Asia, 6,000.

Black bear:

America, 20,000; Asia, 1,000.

Common brown bear:

Asia, 3,000; Europe 2,000.

BEAVER

America, 80,000; Asia, 1,000; Europe, a few skins.

NUTRIA

South America, 1,000,000.

MUSKRAT OR MUSQUASH

America, about 8,000,000; Russia, 3,000.

CHINCHILLA

Peru, 600.

CHINCHILLONA

Peru and Bolivia, 12,000.

BASTARD CHINCHILLA

Bolivia, 3,000; Chili, 25,000.

BADGER

Europe, 100,000; America, 30,000; Asia, Japan and China, 30,000.

SQUIRREL

Siberia, 15,000,000; China, 500,000.

SQUIRREL-TAILS

Siberia, 73 tons; China, 2 tons.

FOX

Red fox:

North America, 200,000; Siberia, 60,000; Russia, 150,000; Mongolia, China and Japan, 50,000; Australia, 30,000; Western and Central Asia, 50,000; Norway, 25,000; Germany, 250,000; other European countries, 350,000.

Karganer fox:

Siberia and Central Asia, 150,000.

Cross fox:

America, 15,000; Siberia, 3,000.

Gray fox:

North America, 50,000.

Kit fox:

North America, 4,000; Central Asia, 60,000.

White fox:

Asia, 70,000; America, 30,000; Europe, 5,000.

Blue fox:

America, 6,000; Siberia, 4,000; Northern Europe, 1,000.

Silver fox:

America, 4,000; Siberia, 300.

Japan fox (raccoon dog):

Japan, 80,000; China, 150,000; Korea, 30,000.

South American foxes:

Pampas fox and Patagonian fox, total about 15,000.

HAMSTER

Germany, 2,000,000; Austria Hungary, 250,000.

HARES

Polar hares:

Siberia, about 5,000,000; North America, 200,000.

WEASEL (Ermine)

America, 400,000; Siberia, 700,000; Europe, 10,000.

POLECAT

Germany, 60,000; Russia and Siberia, 150,000; other European countries, 80,000.

FISHER (Fr. Pekan)

America, 10,000.

RABBIT, CONEY

France, 30,000,000; Belgium, 20,000,000; Germany, 500,000; Galicia and Russia, 1,000,000; Australia, 20,000,000.

CATS

Germany, 120,000; Holland, 200,000; Russia, 300,000; other European countries, 150,000; Asia, China and Japan, 150,000; America, 80,000.

KOLINSKY

Siberia, 150,000; Manchuria, 50,000; China (weasel) 500,000; Japan (mink) 200,000.

LYNX, GRAY WILDCAT

America, 90,000; Asia, 30,000; Europe, 10,000.

WILDCAT

South America, 10,000; Asia, 40,000; Europe and Western Asia, 10,000.

MARTEN

Baum marten:

Europe, 180,000; Northern Asia, 30,000.

Stone marten:

Europe, 350,000; Northern Asia, 30,000.

SABLE AND HUDSON BAY MARTEN

America, 120,000; Siberia, 70,000; China, 20,000; Japan, 5,000.

MARMOT

Asia, 4,550,000; America, 30,000.

MINK

North America, 600,000; Russia and Siberia, about 40,000; Europe, a few.

OTTER (LAND)

America, 30,000; Asia, 55,000; Southern Asia, about 1,000; South America, about 5,000; Africa, about 500; Europe, 30,000.

OPOSSUM

Australia, about 4,000,000; America, about 1,000,000.

PERSIAN AND BLACK LAMBSKINS

Central Asia, Persians 1,500,000, Broadtails 100,000; Russia and Central Asia, Astrachan 1,000,000; Grimean, 60,000; Schiras and salted skins, 200,000.

RACCOON

North America, 600,000.

FUR-SEALS

Alaska, northern waters and southern waters, 68,000.

SEA-OTTER

Northern Pacific, 400.

SKUNK

North America, 1,500,000; South America, 5,000.

CIVET CAT

North America, 100,000.

WOLVERENE

North America, 3,000; Siberia, 4,000; Europe, 1,000.

WOLF

America: timber wolf, 8,000; prairie wolf, 40,000; Asia: Siberia, 10,000; China, 5,000; Central Asia and Russia, 6,000; Europe, 1,000.

AMERICAN AND CANADIAN FURS SOLD BY A. & W. NESBITT AT
PUBLIC AUCTION IN THE YEARS 1905-1912

Kind	1905	1906	1907	1908	1909	1910	1911	1912
Raccoon.....	37,424	26,833	8,471	49,990	60,028	58,323	48,531	60,869
Badger.....	3,720	2,393	1,165	1,264	2,652	3,934	5,229	5,954
Musquash.....	739,630	810,817	371,779	551,081	548,228	679,975	774,126	658,217
Skunk.....	124,357	162,015	130,213	190,298	239,145	239,573	352,313	326,845
Cat, Civet.....	14,507	10,968	4,370	4,786	4,978	6,685	22,647	16,147
Beaver.....	919	10,780	13,577	3,232	6,402	6,122	2,097	2,438
Otter.....	2,614	2,203	1,476	3,831	3,141	2,496	1,429	1,325
Lynx.....	1,382	6,604	6,835	2,307	475	462	470	270
Cat, Wild.....	3,227	2,750	2,532	2,779	1,321	3,593	10,900	5,068
Wolf.....	8,614	12,548	4,580	14,854	10,074	19,223	21,930	30,173
Bear.....	1,164	1,235	1,473	1,890	2,297	3,662	1,960	1,908
Fisher.....	238	726	1,030	768	264	167	300	57
Wolverene.....	65	62	36	84	61	115	57	102
Ermine.....	1,377	7,922	22,362	19,774	29,504	33,276	71,967	41,492
Fox, Silver.....	60	94	243	94	111	102	70	50
Fox, Cross.....	285	489	1,512	756	255	362	102	223
Fox, Red.....	3,974	16,536	6,550	8,034	9,612	8,808	9,574	4,283
Marten.....	3,589	8,388	10,708	5,642	2,889	4,003	1,369	2,942
Mink.....	30,596	29,409	25,338	33,305	18,069	22,127	14,517	10,999
Opos., Am.....	146,328	292,231	30,382	98,397	95,187	77,507	136,417	256,759
Fox, Gray.....	9,966	14,527	3,597	3,724	3,151	7,082	6,613	7,258
Sea-otter.....	7	.....	2	1	.....	11	.....	.....
Musk-ox.....	.....	.....	.....	.....	.....	131	.....	.....
Fox, Blue.....	.....	62	39	25	95	280	48	255

IMPORTATION OF FURS TO LONDON, 1855

By E. Brass.

Kind	FROM THE HUDSON'S BAY CO.'S. TERRITORY		ALASKA, OREGON, EASTERN AND SOUTHERN CANADA, ETC., ETC.,	
	Number	Value	Number	Value
Marten.....	136,513	£122,540	12,245	£11,540
Mink.....	55,740	38,540	171,083	12,305
Sea-otter.....	288	5,400	163	4,280
Beaver.....	69,376	25,480	6,078	4,780
Muskrat.....	346,955	6,540	1,229,536	23,054
Otter.....	11,094	8,545	4,427	4,800
Fisher.....	4,911	0,840	3,174	2,256
Silver Fox.....	480	6,840	218	4,580
Cross ".....	1,749	4,838	920	2,740
Red ".....	8,227	3,945	36,399	16,240
Blue ".....	86	172	5,086	12,758
Grey ".....	.....	.....	15,826	1,825
Kit ".....	4,646	485	5,086	1,025
White ".....	4,646	1,248	354	120
Wolf.....	15,392	4,975	.....	.....
Wolverene.....	1,124	840	180	130
Lynx.....	5,633	3,460	518	230
Wildcat.....	374	120	6,989	2,005
Bear.....	8,961	22,480	3,208	8,425
Ermine.....	1,500	34	500	10
Skunk.....	5,945	6,743	200	40
Raccoon.....	1,200	180	482,072	65,240
Badger.....	1,084	228	.....	.....
Hare.....	83,757	1,025	2,095	50
Opossum.....	.....	.....	12,745	1,875
Squirrel.....	5,800	160	.....	.....
Others.....	28,000	5,000	34,000	8,000

IMPORTATION OF FURS TO LONDON, 1875

By E. Brass

Kind	FROM THE HUDSON'S BAY Co's TERRITORY		FROM ALASKA, EASTERN AND SOUTHERN CANADA, OREGON AND THE NORTHWESTERN UNITED STATES, SOLD BY RETAILERS AND IN THE LONDON SALES	
	Number	Value £	Number	Value £
Marten.....	131,154	173,500	37,712	38,563
Mink.....	72,400	73,840	39,245	33,642
Sea-otter.....	223	5,480	3,653	102,580
Sea-otter (pup)...	.....	.....	520	3,280
Beaver.....	270,903	293,850	65,941	48,647
Muskrat.....	416,833	32,542	2,126,465	145,362
Otter (land).....	13,580	38,762	8,725	24,460
Fisher.....	3,558	11,200	1,868	3,780
Silver Fox.....	789	14,800	751	3,120
Cross ".....	786	3,870	1,451	6,587
Red ".....	8,945	6,325	75,365	28,956
Blue ".....	169	460	2,215	6,084
Gray ".....	.....	.....	25,602	6,850
Kit ".....	5,860	530	9,245	1,640
White ".....	6,026	2,100	2,072	850
Wolf.....	3,056	208	4,481	2,180
Wolverene.....	1,349	1,580	1,248	960
Lynx.....	13,242	11,480	2,504	1,800
Bear.....	6,880	23,500	6,796	22,540
Ermine or Weasel.	3,489	80	44,533	1,200
Skunk.....	2,789	1,860	275,943	81,540
Raccoon.....	7,154	1,240	341,077	58,650
Deer.....	15,005	300	.....	.....
Badger.....	8,386	3,000	12,522	4,540
Hare.....	60,520	5,680	429,474	10,402
Musk-ox.....	23	50	5	10
Buffalo.....	108	560	200	580
Panther.....	.....	.....	165	183
Wildcat.....	.....	.....	2,197	2,650
Squirrel.....	.....	.....	8,146	100
Opossum.....	.....	.....	143,653	2,253
Others.....	53,000	18,000	86,000	22,000

IMPORTATIONS OF FUR-SEALS AND SEA-OTTER TO THE LONDON
AUCTION SALES*By E. Brass*

Year	Fur-seals	Sea-otter	Year	Fur-seals	Sea-otter
1850	12,391	.....	1882	189,694	5,680
1851	13,915	.....	1883	171,205	5,038
1852	9,348	.....	1884	157,329	7,903
1853	16,193	.....	1885	180,059	4,908
1854	9,714	.....	1886	217,704	4,804
1855	18,199	.....	1887	226,370	4,413
1856	29,464	.....	1888	219,670	3,511
1857	20,641	.....	1889	214,577	2,713
1858	9,423	.....	1890	182,653	2,392
1859	14,471	.....	1891	125,731	2,366
1860	13,231	.....	1892	109,123	1,306
1861	24,341	.....	1893	147,047	1,590
1862	31,949	.....	1894	112,253	1,434
1863	27,986	.....	1895	102,759	1,221
1864	20,326	.....	1896	70,579	1,059
1865	17,259	.....	1897	5,567	1,212
1866	19,844	.....	1898	61,776	956
1867	15,967	.....	1899	16,836	739
1868	83,997	.....	1900	22,800	584
1869	149,808	.....	1901	64,201	422
1870	153,654	.....	1902	20,692	406
1871	154,959	3,824	1903	70,137	468
1872	168,672	4,307	1904	35,636	234
1873	170,679	5,095	1905	65,811	335
1874	161,291	4,920	1906	68,757	505
1875	174,107	4,964	1907	49,104	561
1876	167,141	5,059	1908	74,277	339
1877	142,631	5,420	1909	49,744	269
1878	169,497	5,253	1910	44,608	307
1879	175,119	5,176			
1880	205,240	5,533			
1881	210,745	5,647			

VII. Statistics of Fur Prices

TYPICAL PRICES OF A FEW SKINS

By E. Brass

Australian Opossum, Adelaide prime blue, 1880, 16 cts.; 1900, 28 cts.; 1908, 73 cts.; 1909, 97 cts.; 1910, \$1.95.

Wallaby, 1880, 6 cts. to 10 cts.; 1900, 25 cts. to 75 cts.; 1910, 50 cts. to \$1.70.

Kangaroo, 1880, 4 cts. to 12 cts.; 1900, 37 cts. to 60 cts.; 1910, 75 cts. to \$1.45.

Wombats, 1880, 12 cts.; 1900, 36 cts.; 1910, 73 cts.

Native Coats, 1880, 4 cts.; 1900, 24 cts.; 1910, 49 cts.

Bastard Chinchilla, 1880, 73 cts.; 1890, 36 cts.; 1900, \$2.92; 1905, \$4.38; 1910, \$9.73.

Japan Mink, 1900, 12 cts.; 1905, 19 cts.; 1910, 60 cts.

Chinese Weasel, 1900, 7 cts.; 1905, 16 cts.; 1910, 33 cts.

Japan Marten, 1890, 35 cts.; 1900, \$1.43; 1905, \$2.38; 1910, \$3.81.

Japan Fox, 1890, 83 cts.; 1900, \$1.43; 1910, \$4.05.

Skunk, the best lot, 1900, \$2.07; 1908, \$3.30; 1909, \$4.40; 1910, \$7.06; 1911, \$5.10.

Raw Persian, 1890, \$2.06; 1900, \$3.09; 1905, \$4.12; 1908, \$4.64; 1909, \$5.15; 1910, \$6.70.

Stone Marten, 1890, \$1.43; 1895, \$2.14; 1900, \$2.86; 1905, \$3.33; 1908, \$5.23; 1909, \$6.19; 1910, \$6.66.

Marmot, Orenburg, 1890, 10 cts.; 1900, 12 cts.; 1904, 19 cts.; 1905, 43 cts.; 1906, 33 cts.; 1907, 37 cts.; 1908, 33 cts.; 1909, 43 cts.; 1910, 90 cts.

Black Fox, best skin, 1880, \$632.70; 1890, \$876.00; 1900, \$2,822.66; 1905, \$1,070.67; 1906, \$1,557.33; 1907, \$2,141.33; 1908, \$2,238.67; 1909, \$1,508.67; 1910, \$2,628.00.

Sea-otter, 1880, \$584.00; 1890, \$778.67; 1900, \$1,362.67; 1905, \$997.77; 1909, \$1,849.33; 1910, \$1,703.33.

TYPICAL PRICES OF A FEW STAPLE SKINS OF THE HUDSON'S BAY
COMPANY ON THE LONDON FUR AUCTION

By E. Brass

Year	Muskrat, YF, I	Mink, YF, II	Red Fox, YF, I, dark	Lynx, YF, I, large
1882.....	.16	.73	3.11	4.87
1883.....	.15	.97	2.75	6.09
1884.....	.16	1.16	2.75	7.31
1885.....	.12	.59	2.07	4.51
1886.....	.16	.93	2.56	8.72
1887.....	.17	.89	2.60	4.70
1888.....	.19	.65	2.50	5.05
1889.....	.25	1.50	4.05	7.38
1890.....	.22	1.03	2.92	5.73
1891.....	.25	1.36	2.82	6.75
1892.....	.15	1.74	2.92	8.70
1893.....	.17	2.92	2.92	6.70
1894.....	.18	1.42	2.75	4.13
1895.....	.19	1.58	4.20	4.39
1896.....	.24	1.34	2.50	3.33
1897.....	.22	1.46	2.50	2.87
1898.....	.18	1.89	2.66	3.23
1899.....	.16	2.98	4.97	5.12
1900.....	.16	2.58	9.00	10.80
1901.....	.15	2.44	6.20	7.44
1902.....	.13	2.58	8.27	13.38
1903.....	.22	2.70	8.03	22.40
1904.....	.25	2.37	6.81	12.80
1905.....	.17	4.46	7.48	13.15
1906.....	.27	4.54	7.67	13.38
1907.....	.31	6.58	8.07	12.50
1908.....	.41	5.25	9.25	15.60
1909.....	.47	5.61	14.96	32.00
1910.....	.87	6.34	16.55	39.85

FUR SALES OF THE HUDSON'S BAY COMPANY

(Supplied to the Canadian High Commissioner for the Commission of Conservation)

Date	Bear (black)	Bear (brown)	Bear (white)	Wild- cat	Ermine	Fisher	Fox (blue)	Fox (cross)	Fox (red)	Fox (silver)	Fox (white)	Lynx
1850 No.	6,261	.....	89	467	7,920	17	3,033	7,759	877	1,867	43,738
1851 No.	6,262	.....	340	747	6,305	8	1,981	5,581	528	899	20,353
1852 No.	7,205	.....	243	796	5,967	11	2,524	5,675	913	843	8,519
1853 No.	7,484	.....	222	2,002	5,861	46	2,307	6,869	847	3,966	5,361
1854 No.	6,331	.....	135	1,295	4,933	34	1,172	3,175	390	4,070	4,552
1855 No.	9,266	.....	381	1,289	4,901	29	1,790	8,326	493	1,877	5,682
1856 No.	9,346	.....	330	1,940	5,210	102	1,948	7,384	615	10,311	11,358
1857 No.	8,182	.....	214	1,925	5,563	15	3,236	10,526	1,072	4,999	23,362
Price	37/3	.....	.....	.....	32/-	.....	79/6	15/3	16/16/10	7/-	12/8
1858 No.	8,130	.....	208	1,034	5,957	20	3,472	9,707	1,060	2,103	31,642
Price	23/11	.....	.....	.....	26/1	.....	55/6	8/11	10/11/5	4/10	8/1
1859 No.	8,922	.....	189	809	6,950	15	3,982	11,488	1,164	1,577	33,757
Price	25/8	.....	.....	.....	34/1	.....	66/8	12/1	14/6/11	6/4	9/6
Average for decade (dollars)	7.00	.....	.....	.....	7.30	.....	16.40	2.95	67.75	1.46	2.45
1860 No.	8,144	.....	143	1,200	7,197	3	4,030	11,031	1,177	3,395	23,226
Price	23/9	.....	.....	.....	32/11	.....	60/-	12/4	12/13/5	6/10	10/-
1861 No.	7,474	.....	134	1,267	5,853	42	3,407	8,897	1,066	5,069	15,178
Price	28/2	.....	.....	.....	32/10	.....	59/10	11/8	14/11	5/10	8/1
1862 No.	8,214	.....	115	912	5,980	23	2,248	7,782	632	2,805	7,272
Price.	30/9	.....	.....	.....	26/8	.....	41/-	9/9	10/14/11	5/8	8/6
1863 No.	7,571	.....	164	1,178	6,053	29	1,946	6,402	588	3,365	4,448
Price	35/7	.....	.....	.....	26/3	.....	39/-	11/-	10/14/3	6/-	12/3
1864 No.	7,878	.....	75	899	5,424	82	1,963	5,719	612	12,242	4,926
Price	31/5	.....	.....	.....	28/2	.....	34/1	12/2	10/16/3	5/11	14/6

Date	Bear (black)	Bear (brown)	Bear (white)	Wild- cat	Ermine	Fisher	Fox (blue)	Fox (cross)	Fox (red)	Fox (silver)	Fox (white)	Lynx
1865 No.	7,337	.....	63	2,094	4,953	33	1,800	8,760	459	4,821	5,437
Price	32/3	.....	.....	.....	30/4	.....	30/9	10/11	8/17/-	6/7	12/7
1866 No.	8,931	.....	117	1,514	4,605	36	1,912	7,660	579	5,919	16,498
Price	27/3	.....	.....	.....	30/10	.....	33/5	9/11	6/19/2	11/6	11/7
1867 No.	7,603	.....	83	3,526	4,864	42	2,712	20,824	888	5,404	35,971
Price	23/3	.....	.....	.....	36/2	.....	35/5	7/-	7/16/-	7/11	8/2
1868 No.	6,920	.....	94	3,869	6,311	13	5,080	26,822	1,253	2,541	76,556
Price	27/1	.....	.....	.....	33/5	.....	22/3	6/-	6/11/6	11/9	6/10
1869 No.	8,661	.....	89	1,979	7,477	124	5,174	20,267	1,490	12,088	68,392
Price	26/9	.....	.....	.....	32/11	.....	22/4	7/9	5/10/10	8/1	6/1
Average for decade (dollars)	6.87	.....	.....	.....	7.46	.....	9.07	2.36	45.70	1.83	2.37
1870 No.	8,420	.....	68	2,223	7,959	48	3,436	13,058	914	4,629	37,447
Price	27/6	.....	.....	.....	35/5	24/-	19/7	7/9	5/15/4	6/10	5/6
1871 No.	8,589	.....	82	3,106	6,743	15	2,592	6,546	696	1,805	15,686
Price	29/4	.....	1/6	*32/8	35/6	27/-	19/3	8/4	4/12/-	6/6	6/6
1872 No.	8,569	.....	46	2,958	7,072	36	2,090	7,736	559	2,806	7,942
Price	42/1	.....	2/3	*32/9	49/3	49/3	27/9	9/6	9/9/8	10/6	11/10
1873 No.	8,172	.....	24	4,012	3,639	90	2,315	8,339	694	7,325	5,123
Price	41/-	.....	2/3	.....	48/1	45/3	24/10	10/-	9/11/9	8/-	19/10
1874 No.	7,431	.....	28	4,477	3,539	60	1,645	7,428	416	5,315	7,106
Price	41/9	.....	2/3	*20/2	53/9	47/1	28/8	9/2	11/5/3	7/1	14/4
1875 No.	7,120	.....	189	4,732	3,558	69	2,212	8,973	795	6,058	11,250
Price	41/3	.....	1/9	*13/-	51/2	57/9	46/6	9/3	14/6/7	8/3	14/2
1876 No.	7,804	.....	83	6,360	3,263	58	2,455	9,838	687	4,323	18,774
Price	38/2	.....	2/09	*12/-	55/8	56/2	44/2	9/11	13/3/-	6/11	13/-

*Prices quoted for ermine are so much per timber of 40 skins.

FUR SALES OF THE HUDSON'S BAY CO. (Continued)

Date	Bear (black)	Bear (brown)	Bear (white)	Wild- cat	Ermine	Fisher	Fox (blue)	Fox (cross)	Fox (red)	Fox (silver)	Fox (white)	Lynx
1877 No.	7,543	.....	40	5,338	3,338	48	3,550	11,233	971	5,299	30,508
Price	25/5	.....	.....	.....	37/-	48/4	27/6	6/11	7/18/3	5/9	8/3
1878 No.	7,415	.....	10	5,838	5,461	239	4,201	16,791	1,063	24,402	42,834
Price	24/3	.....	.....	.....	30/1	44/8	22/6	6/4	8/4/6	4/6	7/5
1879 No.	7,796	.....	10	4,956	6,132	60	3,493	13,038	914	5,958	27,345
Price	27/11	.....	.....	*13/4	38/10	30/-	21/3	7/10	10/19/3	9/10	8/7
Average for decade (dollars)	8.13	.....	.51	4.96	10.43	10.31	6.77	2.04	47.25	1.78	2.63
1880 No.	5,951	.....	2	2,324	4,216	24	3,289	12,401	830	2,311	17,834
Price	32/-	.....	3/6	*11/5	35/2	26/4	36/5	9/4	11/14/10	11/7	10/1
1881 No.	8,531	.....	24	3,695	5,059	50	3,224	9,126	912	4,362	15,386
Price	36/2	.....	3/9	*6/8	36/4	31/6	37/11	9/-	11/4/6	11/6	12/7
1882 No.	8,021	.....	6	4,561	5,143	55	2,244	6,035	668	5,722	9,443
Price	39/-	.....	4/-	*2/-	34/5	31/3	40/6	9/3	11/19/4	7/2	14/8
1883 No.	11,188	.....	19	5,112	4,640	37	1,762	5,869	506	5,886	7,599
Price	45/1	.....	3/6	*2/1	33/-	32/-	38/-	9/3	13/2/9	6/7	16/9
1884 No.	5,515	.....	10	3,912	3,820	76	1,489	4,696	336	6,461	8,061
Price	64/9	.....	2/-	*2/5	33/3	45/6	39/7	9/-	14/18/10	7/7	19/2
1885 No.	10,765	.....	24	7,042	4,200	18	2,192	10,090	622	2,801	27,187
Price	63/-	.....	2/3	*4/11	21/5	28/8	27/9	5/11	8/17/8	10/6	11/8
1886 No.	8,386	.....	10	4,780	4,041	18	3,237	11,526	874	3,280	51,511
Price	62/5	56/4	45/6	2/-	*4/4	23/11	23/-	34/9	7/-	14/6/5	11/7	18/9
1887 No.	8,279	.....	.....	4,166	4,510	35	3,221	11,830	836	4,152	74,050
Price	79/8	104/10	40/9	.....	*1/10	22/10	85/4	33/4	7/9	13/-/-	19/4	9/9

*Prices quoted for ermine are so much per timber of 40 skins.

Date	Bear (black)	Bear (brown)	Bear (white)	Wild- cat	Ermine	Fisher	Fox (blue)	Fox (cross)	Fox (red)	Fox (silver)	Fox (white)	Lynx
1888 No. Price	..... 58/9	10,080 94/1	..... 36/8	33 2/-	3,933 *8/6	6,165 20/8	73 118/6	3,877 26/4	17,238 7/3	954 9/1/10	13,170 10/7	78,773 9/4
1889 No. Price	..... 87/3	9,606 114/2	..... 51/7	18 5/7	3,592 *19/10	5,408 36/-	77 81/3	2,935 42/1	14,503 8/11	639 13/7/-	9,551 18/4	33,899 19/1
Average for decade (dollars)	13.63	15.50	10.82	.76	*1.54	7.13	12.03	9.04	1.98	58.40	2.73	3.40
1890 No. Price	..... 59/2	11,719 73/-	..... 49/1	.....	5,697 *11/2	6,557 25/6	25 44/6	2,908 36/9	12,058 7/9	649 11/16/9	2,893 12/4	18,886 13/7
1891 No. Price	..... 77/7	8,960 98/10	..... 71/4	14 3/1	5,417 *12/2	5,683 27/9	38 87/10	2,518 44/6	14,134 8/-	565 17/1/5	3,725 10/1	11,529 13/7
1892 No. Price	..... 71/3	1,875 92/8	..... 61/11	13 5/6	5,516 *13/4	5,208 25/8	83 65/5	2,766 40/2	11,256 9/1	665 14/8/11	9,626 7/5	8,352 19/4
1893 No. Price	..... 80/4	9,683 120/-	..... 90	5 3/-	9,120 *15/-	4,828 32/9	51 50/3	2,673 40/6	11,964 8/9	615 19/5/-	4,708 8/6	8,660 16/7
1894 No. Price	..... 78/7	7,727 105/5	..... 134	7 10	9,096 *30/4	4,044 32/1	34 54/8	3,025 37/-	16,031 8/1	617 18/2/4	3,231 8/8	12,902 11/6
1895 No. Price	..... 76/9	1,190 107/3	..... 33/11	29 1/-	7,250 *19/6	3,631 32/1	69 49/4	3,208 38/9	13,081 8/3	682 16/-/3	4,948 19/6	20,331 12/1
1896 No. Price	..... 47/3	8,467 60/4	..... 39/5	15 1/4	9,302 *22/-	4,169 31/10	67 34/7	5,044 26/-	20,311 6/3	981 10/8/-	6,681 10/2	36,853 7/9
1897 No. Price	..... 36/4	9,318 45/11	..... 41/1	50 2/1	8,340 *25/1	4,805 36/3	44 32/3	6,963 22/9	24,676 6/-	1,398 9/2/7	3,498 10/6	56,407 6/2

*Prices quoted for ermine are so much per timber of 40 skins.

FUR SALES OF THE HUDSON'S BAY CO. (Continued)

Date	Bear (black)	Bear (brown)	Bear (white)	Wild- cat	Ermine	Fisher	Fox (blue)	Fox (gross)	Fox (red)	Fox (silver)	Fox (white)	Lynx
1898 No.	9,166	972	141	32	7,704	5,247	46	6,507	25,691	1,250	3,228	39,437
Price	45/-	41/8	40/-	2/7	*36/-	32/10	28/2	22/9	7/2	11/6/11	13/2	7/1
1899 No.	8,993	910	130	27	9,786	4,964	61	5,358	20,399	1,018	6,681	26,761
Price	46/10	36/-	48/6	1/6	*21/3	30/3	110/-	31/8	12/7	21/19/1	24/4	10/1
Average for decade (dollars)	14.86	18.75	11.84	.53	* 5.18	7.37	13.37	8.18	1.87	71.80	3.00	2.83
1900 No.	9,137	897	118	67	14,075	5,042	19	3,742	11,533	608	3,623	15,185
Price	47/-	45/2	43/10	5/9	*33/10	29/6	89/5	49/6	24/3	50/16/1	37/4	27/7
1901 No.	7,829	778	58	41	11,664	3,454	24	1,534	5,446	325	2,929	4,473
Price	46/8	39/7	47/5	5/9	*43/6	22/10	39/8	34/5	13/7	17/11/3	21/1	17/3
1902 No.	7,087	788	170	5	16,374	3,716	68	1,460	6,992	283	8,515	5,781
Price	54/5	52/9	99/2	7/6	*48/-	24/4	50/10	35/-	23/3	29/1/11	21/9	29/6
1903 No.	6,445	726	96	4	33,883	3,235	90	1,974	6,235	493	10,751	9,117
Price	44/7	38/6	81/10	.....	*31/8	30/7	40/9	38/6	23/3	33/15/7	23/7	45/8
1904 No.	6,085	640	55	5	15,902	2,590	43	2,212	6,216	422	5,579	19,267
Price	26/11	22/6	89/9	2/6	*134/3	23/2	36/5	27/1	19/3	17/9/0	18/3	24/4
1905 No.	4,614	463	54	.....	12,670	2,095	17	2,396	7,215	491	4,690	36,116
Price	33/5	30/2	91/10	.....	*182/1	29/-	55/-	25/8	17/8	30/2/14	17/7	27/-
1906 No.	5,041	495	149	2	21,704	3,020	44	5,011	12,204	942	6,394	58,850
Price	31/9	31/2	149/11	.....	*152/4	28/4	80/11	22/7	19/3	34/6/	40/7	26/10
1907 No.	4,177	435	138	2	25,633	4,022	89	5,457	12,736	1,067	11,459	61,478
Price	33/7	30/10	95/6	.....	*122/1	40/-	77/3	22/2	23/1	32/5/8	28/7	27/3
1908 No.	4,100	388	60	.....	27,821	4,701	64	3,194	7,537	663	6,785	36,301
Price	26/7	28/1	75/1	.....	*65/-	35/3	77/10	34/3	25/11	34/14/2	30/8	38/5

*Prices quoted for ermine are so much per timber of 40 skins.

Date	Bear (black)	Bear (brown)	Bear (white)	Wild- cat	Ermine	Fisher	Fox (blue)	Fox (cross)	Fox (red)	Fox (silver)	Fox (white)	Lynx
1909 No. Price Average for decade (dollars)	4,042 44/8 9.37	397 41/2 8.76	93 95/9 21.17	1 1.29	26,872 *94/2 *23.00	3,600 55/- 7.63	14 76/7 15.00	1,782 45/8 8.03	3,641 41/5 5.56	397 50/3/3 158.55	2,068 47/10 6.89	9,704 87/4 8.42
1910 No. Price	4,579 58/11	453 45/3	71 129/1	.....	34,281 *109/2	2,525 68/4	28 82/11	1,380 58/2	3,396 48/3	281 85/2/11	4,803 60/9	3,410 123/1
1911 No. Price Average for decade (dollars)	4,964 47/9 12.80	384 36/6 9.81	82 69/- 23.80	2 10/- 2.42	49,963 *90/8 23.98	2,310 81/11 18.04	113 92/5 21.04	2,067 92/10 18.12	4,558 42/2 10.85	382 61/12/11 352.30	14,692 39/10 12.07	3,774 102/4 27.05

*Prices quoted for ermine are so much per timber of 40 skins.

FUR SALES OF THE HUDSON'S BAY CO. (Continued)

Date	Marten	Mink	Musk ox	Mus- quash or Muskrat	Otter (land)	Otter (sea)	Raccoon	Seal (fur)	Seal (hair)	Skunk	Wolf	Wolver- ene
1850 No.	65,051	29,619	..	175,472	11,080	138	1,338	7	814	1,262	12,088	1,491
1851 No.	64,495	21,151	.....	194,682	8,928	79	1,847	11	340	1,136	9,747	1,424
1852 No.	88,412	24,859	.....	292,530	8,959	229	1,255	24	858	1,452	7,813	1,773
1853 No.	73,055	25,152	.....	493,952	8,991	214	1,695	.....	1,425	1,619	8,508	1,302
1854 No.	91,882	42,375	.....	512,291	12,079	236	1,193	13	2,021	4,474	6,788	1,090
1855 No.	137,009	50,839	.....	345,626	11,141	338	1,676	15	2,842	5,959	15,419	1,154
1856 No.	179,736	61,581	.....	258,806	13,802	319	1,798	38	5,267	11,320	7,588	1,145
1857 No.	171,022	61,951	.....	302,267	11,577	187	1,895	79	8,649	7,750	9,572	923
Price	17/5	8/6	.....	1/-	19/6	17/6/9	2/1	.....	2/7	9/5	11/11	16/4
1858 No.	138,535	76,231	.....	313,502	12,511	343	2,295	39	13,112	8,213	7,728	1,087
Price	12/-	4/-	.....	6d	15/7	8/11/8	2/2	.....	2/3	5/7	5/3	8/9
1859 No.	139,124	63,264	.....	254,246	13,165	174	1,273	116	12,767	8,529	12,659	1,129
Price	14/5	7/7	.....	10½d	26/4	10/2/7	2/1½	.....	2/6	6/2	6/10	10/3
Average for decade (dollars)	3.55	1.62	.....	.19	5.00	58.48	.51	.....	.60	1.70	1.92	2.82
1860 No.	102,235	44,730	.....	177,291	11,279	175	2,434	196	11,147	9,983	8,670	1,416
Price	18/3	7/4	.....	10d	24/3	10/16/10	1/2	.....	2/8	2/4	5/4	10/1
1861 No.	74,738	31,094	.....	206,020	13,199	129	3,397	186	18,104	3,758	6,051	1,410
Price	19/5	6/9	.....	9½d	20/5	16/11/9	1/3	.....	2/-	2/3	4/9	10/2
1862 No.	80,484	49,452	.....	335,385	14,158	84	3,640	176	13,726	3,315	4,087	1,529
Price	19/8	6/7	.....	7d	19/8	12/17/9	1/9½	.....	1/9	3/10	4/11	10/2
1863 No.	79,979	43,961	.....	357,060	13,331	106	3,883	403	16,933	1,969	3,932	1,426
Price	20/1	9/2	.....	7½d	19/2	12/16/6	1/5	.....	1/6	5/11	6/10	10/11
1864 No.	112,396	61,727	23	509,769	15,443	189	1,794	655	15,297	2,966	8,035	1,328
Price	17/8	8/7	32/6	7½d	16/9	14/19/6	1/7	.....	1/5	3/2	8/3	13/3

Date	Marten	Mink	Musk ox	Mus- quash or Muskrat	Otter (land)	Otter (sea)	Raccoon	Seal (fur)	Seal (hair)	Skunk	Wolf	Wolver- ene
1865 No.	124,830	60,334	8	418,370	13,600	167	3,335	977	14,500	1,617	5,717	1,230
Price	16/4	8/10	.....	8d	14/3	11/5/10	1/1	.....	2/1	2/11	8/3	12/9
1866 No.	142,970	51,404	9	320,824	18,380	103	4,710	2,086	15,122	2,780	12,616	909
Price	18/9	11/2	35/-	11½d	18/11	6/15/9	1/4	.....	1/9	3/2	8/9	13/7
1867 No.	126,616	58,451	.....	412,164	15,271	182	11,678	2,314	21,458	2,779	6,340	768
Price	16/3	9/5	28/10	11½d	14/8	7/19/3	1/2	.....	2/5	1/8	9/7	13/3
1868 No.	106,784	73,575	33	618,081	14,992	147	21,321	2,225	9,819	6,208	7,526	1,111
Price	18/1	12/2	48/11	9½d	22/1	9/13/6	1/10	.....	1/10	2/2	10/6	15/1
1869 No.	81,706	74,343	14	404,173	12,545	242	4,894	1,727	7,927	6,679	9,318	1,457
Price	19/-	10/-	63/-	9½d	28/4	6/15/4	1/4	19/10	2/11	3/4	17/9	13/11
Average for decade												
(dollars)	4.40	2.19	.....	.19	4.98	53.11	.33	4.76	.49	.74	4.04	2.96
1870 No.	52,308	27,708	72	232,251	10,973	89	1,696	688	9,917	9,606	5,856	1,421
Price	24/8	8/8	30/10	7d	26/2	6/9/10	11d	13/5	2/8	4/2	9/7	12/-
1871 No.	55,453	31,985	4	443,989	13,105	107	3,341	7,944	15,740	3,286	5,399	1,848
Price	27/6	10/9	30/-	8d	29/3	8/10/-	1/6	13/5	3/1	4/2	7/11	12/-
1872 No.	60,455	39,266	44	704,789	13,787	66	4,011	13,620	5,433	2,621	2,802	1,656
Price	28/11	15/3	45/1	10d	38/6	18/-/-	2/1	16/4	3/7	8/1	13/-	12/3
1873 No.	66,841	44,740	7	767,896	11,263	99	3,636	2,073	9,862	1,759	6,413	2,095
Price	24/8	12/3	.....	9½d	44/6	11/15/-	1/5	45/9	3/7	3/7	12/9	14/7
1874 No.	66,750	60,429	54	671,982	9,010	96	3,152	2,354	3,259	1,322	3,724	1,765
Price	19/9	10/6	79/-	11½d	34/4	7/18/-	2/1	40/7	4/11	4/4	9/9	17/8
1875 No.	131,170	72,273	11	523,802	13,088	134	7,241	2,131	14,099	2,077	3,074	1,351
Price	18/3	10/1	30/-	1/2	29/4	9/14/-	1/6	28/11	5/2	5/3	12/-	20/4
1876 No.	83,439	79,214	9	533,319	11,524	47	2,149	2,718	3,620	2,828	2,033	1,286
Price	14/6	5/11	40/-	1¼	26/4	8/16/-	2/11	32/2	2/4	4/8	14/-	27/8

FUR SALES OF THE HUDSON'S BAY CO. (Continued)

Date	Marten	Mink	Musk ox	Mus- quash or Muskrat	Otter (land)	Otter (sea)	Raccoon	Seal (fur)	Seal (hair)	Skunk	Wolf	Wolver- ene
1877	81,174 11/5	79,060 5/5	127	437,121 8d	9,926 18/5	127 5/2/7	1,042 1/9	1,588 23/2	7,564 3/7	3,928 2/7	1,865 13/9	1,136 22/9
1878	74,703 9/11	84,244 4/4	118	486,030 4½d	11,753 17/1	47 9/16/2	514 1/11	1,779 37/4	7,636 3/7	6,933 4/-	2,975 12/1	1,794 22/2
1879	55,734 12/4	62,590 4/3	235 24/9	499,727 5½d	13,101 24/9	26 7/13/4	613 1/4	2,782 41/5	6,626 2/3	8,395 3/4	2,590 9/1	1,997 19/2
Average for decade (dollars)	4.61	2.10	9.59	.09	6.93	45.00	.42	7.02	.83	1.11	2.73	4.33
1880	46,273 11/2	35,072 5/1	567 16/1	478,078 6d	8,313 31/11	88 13/15/10	15 3/-	3,308 57/8	4,174 3/3	7,927 4/3	4,707 7/-	1,777 17/-
1881	46,030 10/11	36,160 4/2	655 25/6	829,034 5½d	10,177 34/9	22 13/16/8	830 2/7	3,085 43/4	4,287 2/2	6,818 4/3	3,136 10/9	2,471 14/3
1882	52,631 10/6	45,600 3/2	564 24/6	1,029,296 7d	10,191 30/10	77 15/2/-	538 2/8	5,005 23/8	5,442 2/9	5,407 4/11	1,459 15/7	1,614 13/11
1883	62,711 8/9	47,508 3/4	368 58/-	1,069,183 6d	11,992 26/10	7 12/17/-	841 2/8	652 40/-	3,888 2/11	7,178 5/1	2,121 12/5	1,883 15/6
1884	71,116 12/-	52,290 4/3	235 61/4	1,083,067 6d	9,248 31/7	26 10/16/6	354 3/5	560 29/10	2,713 2/10	6,474 4/10	1,580 11/10	1,583 22/-
1885	78,981 7/9	110,824 2/-	316 54/10	817,003 4d	12,260 17/6	35 12/9/-	139 2/11	13 10/-	1,590 2/6	12,647 3/5	1,848 10/4	1,528 24/6
1886	79,027 11/4	76,503 3/3	395 79/4	347,050 4½d	10,875 30/9	10 21/4/-	124 3/7	2,077 14/9	6,965 2/4	21,249 4/9	1,344 11/7	1,203 24/-
1887	51,151 9/6	64,303 2/9	222 79/3	380,132 4½d	8,326 31/10	10 25/12/-	325 2/11	1,846 36/6	1,279 2/-	11,009 3/10	1,180 18/7	1,245 30/6

Date	Marten	Mink	Musk ox	Mus- quash or Muskrat	Otter (land)	Otter (sea)	Raccoon	Seal (fur)	Seal (hair)	Skunk	Wolf	Wolver- ene
1888 No.	73,259	83,023	514	344,878	11,613	11	250	179	2,590	16,390	4,793	2,452
Price	7/6	2/3	112/5	6d	32/8	17/13/4	3/8	15/9	1/9	3/6	7/3	20/3
1889 No.	64,558	43,748	505	223,614	8,771	11	217	737	672	11,344	3,404	2,031
Price	11/4	5/3	126/-	10½d	41/9	22/12/8	2/11	41/8	2/8	4/1	8/11	18/6
Average for decade (dollars)	2.42	.85	15.39	.12	7.45	79.68	.80	7.52	.60	1.03	2.74	4.81
1890 No.	73,123	35,396	1,405	322,160	9,298	15	153	482	2,151	10,814	2,532	2,243
Price	8/-	3/9	64/10	8½d	34/8	26/13/4	2/10	45/-	2/1	3/5	8/3	15/9
1891 No.	65,146	29,479	1,358	574,742	8,193	9	172	279	2,545	12,665	4,286	1,416
Price	7/7	4/10	54/6	9d	38/2	33/2/2	2/11	64/8	3/2	3/9	6/2	13/2
1892 No.	73,850	42,264	1,935	806,103	9,798	6	171	932	2,604	10,646	1,725	1,147
Price	8/7	5/8	53/7	5d	32/10	36/13/4	2/5	45/7	2/6	3/5	12/-	16/11
1893 No.	100,257	58,171	888	934,646	8,671	8	194	8,491	2,599	9,214	1,577	1,017
Price	12/9	8/7	75/3	5½d	40/8	25/-/-	3/-	48/1	3/1	3/11	10/5	33/10
1894 No.	110,015	50,815	1,187	648,687	7,474	11	218	37,129	2,508	6,841	2,086	389
Price	8/9	4/6	41/4	5½d	39/2	34/10/10	2/3	35/5	3/-	3/5	7/9	15/1
1895 No.	107,002	51,285	761	674,811	7,512	1	743	36,577	2,183	8,885	1,498	652
Price	15/7	5/2	46/10	4½d	40/-	13/-/-	1/11	45/-	2/8	3/4	7/9	18/7
1896 No.	103,329	70,229	494	813,159	8,919	.....	575	783	1,817	13,664	2,655	579
Price	17/1	4/6	39/6	6½d	43/2	.....	2/1	45/4	2/2	2/2	6/4	16/4
1897 No.	95,911	76,365	326	551,716	9,346	3	1,642	39,133	4,765	18,842	3,980	822
Price	15/2	4/6	40/11	7d	37/8	3/15/-	2/-	30/6	1/7	1/7	4/6	13/5

FUR SALES OF THE HUDSON'S BAY CO. (Continued)

Date	Marten	Mink	Musk ox	Mus- quash or Muskrat	Otter (land)	Otter (sea)	Raccoon	Seal (fur)	Seal (hair)	Skunk	Wolf	Wolver- ene
1898 No. Price	85,284 16/6	70,407 5/10	340 38/5	568,934 7d	9,690 37/3	2 3/15/-	6,466 1/9	21,177 47/3	2,698	16,755 1/11	7,655 4/8	1,064 10/3
1899 No. Price	67,738 27/1	41,839 9/7	453 44/10	701,487 6½d	10,016 37/5	1	2,916 2/5	8,821 65/5	2,791 2/4	9,874 3/2	3,575 6/11	904 21/6
Average for decade (dollars)	3.29	1.27	12.00	.13	9.14	86.57	.57	11.33	.60	.72	1.79	4.20
1900 No. Price	64,446 32/11	45,978 8/1	516 69/-	767,741 6d	9,799 45/2	6 74/11/8	13,544 2/4	21,620 64/8	4,158 3/9	11,012 4/3	3,104 16/-	923 20/7
1901 No. Price	55,777 28/4	47,813 7/-	574 97/7	928,199 5½d	9,190 41/3	1 90/-/-	9,177 2/1	9,039 58/8	2,599 2/10	6,172 3/1	2,643 7/-	776 23/4
1902 No. Price	57,131 31/2	57,620 10/-	274 103/10	1,650,214 4½d	8,711 49/-	.....	1,973 3/1	8,352 58/2	3,061 2/10	5,749 2/11	1,366 19/4	635 27/3
1903 No. Price	79,147 30/6	66,549 11/3	256 64/7	1,488,287 7d	10,296 71/5	1 3/7/6	1,024 3/2	5,832 68/4	2,509 3/3	5,207 4/-	1,805 19/-	695 26/1
1904 No. Price	52,639 22/9	54,673 9/8	333 63/-	924,439 8½d	6,463 52/2	.....	718 2/11	6,532 72/6	1,124 3/11	5,427 2/10	1,972 15/11	627 16/5
1905 No. Price	35,752 34/2	55,996 17/-	100 86/9	1,056,253 7d	4,892 77/6	.....	404 3/3	35 75/1	762 6/5	6,090 4/2	1,246 14/6	412 18/-
1906 No. Price	45,441 49/1	60,053 16/3	92 72/6	695,070 9½d	10,580 72/4	.....	281 2/11	50 102/-	3,706 3/11	9,129 4/7	1,707 13/-	504 19/2
1907 No. Price	47,494 49/6	39,169 23/10	45 118/8	407,472 1/-	7,726 74/6	.....	602 3/8	65 94/-	1,152 3/7	11,581 2/11	2,799 11/3	730 24/1
1908 No. Price	34,874 43/6	21,534 21/2	113 82/1	172,418 1/4½	6,137 85/9	.....	243 2/4	.....	1,522 3/9	5,235 3/8	4,510 13/-	894 18/7

Date	Marten	Mink	Musk ox	Mus- quash or Muskrat	Otter (land)	Otter (sea)	Raccoon	Seal (fur)	Seal (hair)	Skunk	Wolf	Wolver- ene
1909 No. Price Average for decade (dollars)	23,640 43/1 8.76	17,857 24/4 3.57	107 296/8 25.31	302,195 1/7 .19	6,361 89/9 15.81	..... ..... 268.80	141 2/9 .73	..... ..... 14.24	1,766 3/1 .89	1,591 6/1 .92	3,858 20/3 3.58	763 29/11 5.36
1910 No. Price	28,979 41/3	21,788 29/6	76 188/10	749,142 2/7 1/4	5,487 99/9	..... .....	266 4/3	..... .....	1,517 2/7	1,613 8/9	3,149 18/6	807 31/4
1911 No. Price Average for decade (dollars)	29,338 39/6 9.60	33,008 22/6 6.24	91 166/8 42.66	963,597 1/3 1/4 .47	6,532 71/- 20.49	..... ..... .....	197 6/5 1.28	..... ..... .....	1,290 3/7 .74	1,037 6/3 1.80	2,412 18/1 4.39	902 20/9 6.25

Index

A	PAGE
Alaska, blue foxes in.....	56
blue fox breeders in.....	59
diseases among foxes in.....	45
reindeer in.....	92, 131
'Alaska' seal.....	6
Alberton, black foxes near.....	53
Aleutian islands, blue foxes on...	58
American Breeders' Association...	115, 117, 119
furs sold by Nesbitts, 1905-12..	142
sable.....	78
Animals, wild, value of.....	115
Antelope, breeding of.....	121
Anticosti island, fox breeding on.	14
Arctic fox—See <i>blue fox</i> and <i>Polar fox</i> .	
transportation.....	92
Astrachan.....	6
Athabaska river foxes.....	24
Automobile, relation of, to demand for furs.....	3

B

Bailey, Vernon, on the otter.....	80
'Baltic' fox.....	6
Bateson, W., on fox breeding....	18
'Bear, silver'.....	6
Beaver.....	90, 128
preserves.....	91
skins, prices of.....	91
uses of.....	90
Beetz, Johann, fox breeder.....	13
Black fox	
American Breeders' Assoc. on..	126
skins, number produced.....	109, 110
skins, prices of.....	2, 111
skins sold from P.E.I.....	114
Blue fox—See <i>Polar fox</i> .	
Blue fox.....	56
American Breeders' Assoc. on..	127
breeders in Alaska.....	59
breeding of.....	57, 66
farming.....	56
food for.....	57

Blue fox (<i>cont'd</i>)	PAGE
of Pribilof islands.....	60
rate of increase of.....	57
selecting breeders.....	63
skins, value of.....	57
Bowers, Geo. M., on parasitic fox disease.....	45
Brass, E., estimate of number of beaver skins by.....	90
estimate of production of fox skins.....	54, 109, 110
fur production by continents...	138
importation of furs to London	143, 145
estimate of number of mink skins by.....	72
estimate of raccoon pelts by....	70
statistics of fur prices.....	146
Breeding of foxes—See <i>Fox breeding</i>	
Broadtail.....	6, 9
Bruce, Cummings, McConnell, fox breeders.....	13
Burrowman, T. L., fox breeder.	13, 14
cement fox kennels of.....	35
orchard ranch of.....	28
price for fox skins received by	114

C

Campbell, R. H., on reindeer in Canada.....	92
Canadian furs sold by Nesbitt's, 1905-12.....	142
legislation on fur-farming.....	135
mammals, three orders of.....	11
Carcross, Y. T., foxes near.....	53
Carnivora.....	10
Cased method of skinning.....	97
Castle, W. E., Prof., on fox breeding.....	22
Cat, domestic.....	1, 6
Caton, J. S., on breeding wapiti...	122
Cement fox kennel.....	35
Centreville, mink ranch at.....	76
Charlottetown, P.E.I., foxes near.	53
Chaud, lac, mink, ranch at.....	72

	PAGE
Chinchilla.....	12
Chinese water deer.....	120
Clark, Rev. Geo., fox breeding by.....	13, 22
Classification, geographical, of furs.....	110
Close seasons.....	3
Cocks, A. H., marten farmer.....	78
Colony plan of mink-ranching.....	74
Colour phases of red fox.....	17
Colours, natural, of furs.....	100
Constipation in foxes.....	43
Commerce in raw furs.....	104
Coney.....	6
Corporations for fox-farming.....	1
Cross foxes, breeding of.....	22

D

Dalton, Chas., pioneer P. E. I. fox, breeder.....	14, 24
sales of fox skins by, in 1910..	112
Davenport, Dr. Eugene, on Men- del's Law.....	19
Deer, fallow.....	120
Virginia, experiments with.....	117
Diarrhoea in foxes.....	43
Digestion, disorders of, in foxes..	43
Diseases of foxes:	
constipation.....	43
diarrhoea.....	43
indigestion.....	43
mange.....	41
parasitic epidemic.....	45
rickets.....	42
worms.....	43
Diseases of blue foxes.....	67
Domestication of fur-bearers.....	10
Domestic fur-bearers.....	6, 9
Dressing furs.....	100
Durability of furs.....	103
Dyeing of furs.....	100
of mink skins.....	72

E

Eland, domestication of.....	121
Elk, American—See <i>Wapiti</i> .	
Ermine.....	71
Eskimo dog.....	92
owners of reindeer.....	132

	PAGE
Exotic species, breeding of..	6, 10, 120

F

Fairs, European.....	104
Fences for ranches.....	28
Financial aspects of fox-farming..	48
Fisher.....	79
popularizing the.....	6
Fleas on foxes.....	44
Food for foxes.....	36
Forests, destruction of.....	3
Fort Smith, reindeer near.....	95
Fox, attempts to domesticate....	13
black, domesticating experi- ments with.....	12
black, how to identify.....	18
black, prices of pelts of.....	1
red, colour phases of.....	17
red, range of.....	16
red, sub-species of.....	16
silver—See <i>Fox, black and Black fox</i>	
Fox-breeding, Prof. W. Bateson on	19
results of various matings.....	17
to secure dark coloured pelts..	20
Foxes in captivity, percentage of, in P.E.I.....	2
in Canada.....	53
Fox fur, when prime.....	46
Fox-ranch:	
of Holt, Renfrew & Co.....	13
location for.....	25
of Paquet Bros.....	13
of Revillon Frères.....	13
Fox-ranches, fencing of.....	28
number of, in existence in 1909.	15
in United States.....	54
Fox-ranchers, organizations among	55
Fox-ranching:	
life of the boom in.....	51
catching and handling of foxes.	46
centres of the industry.....	53
construction of kennel.....	35
construction of nest.....	35
construction of pens.....	33
disease and hygiene.....	41, 42
failure of early attempts at....	15
financial aspects.....	48

Index

Fox ranching (<i>con'd</i>)	PAGE		PAGE
food and feeding.....	36, 38	Fur trade, centres of.....	104
necessity of experienced keeper.....	39	English.....	107
in Ontario.....	13	Furs, geographical classification of.....	110
practice.....	25	deceptions in.....	7
in Quebec.....	13	dyeing of.....	100
woodland site for ranch.....	26	frauds in selling.....	9
Fox skins, final value of silver.....	54	imitations of.....	7
how to judge.....	48	list of misdescriptions.....	8
production of.....	54, 109, 110	list of permissible descriptions.....	8
quality of.....	52	popularizing.....	6
red, prices of.....	23	produced yearly.....	139
Foxes, best furred.....	23	raw, commerce in.....	104
black, prices of.....	15	re-naming.....	6
breeding of, to secure dark colour.....	18	scarcity of.....	2
diseases of.....	41	weight and warmth of.....	103
rate of increase.....	52, 54	world's sales of.....	104
mating and gestation.....	39		
results of various matings.....	17	G	
sales of, for breeding.....	49	Generosoff, Vladimir, on sable	
speculation in.....	49, 50	breeding in Russia.....	12
Frauds in selling furs.....	9	German fur dyeing.....	100
Fraser, Alfred, decreasing fur supply.....	4	Gestation, period of, for foxes.....	39
increasing fur prices.....	4	Gordon, James, early P. E. I. fox	
French fur buyers.....	107	breeder.....	15
Frost, Wesley, on climate of P.E.I.....	25	Gordon, J. S., sales of fox skins by,	
on fox-farming.....	50	in 1910.....	113
Fur-bearers, defined.....	96	Great Slave lake, reindeer at.....	95
domestication of.....	10	Greely, A. W., on blue foxes.....	58
the precious.....	11	Grenfell, Sir Wilfred, introduction	
Fur-bearing animals, breeding of.....	125	of reindeer by.....	93
Fur buyers, French.....	107		
Fur-farming, animals used in, in		H	
Canada.....	1	Handling fur animals.....	129
Canadian legislation <i>re</i>	135	Harmony Co.....	104
common red fox.....	16	Harriman Alaska Expedition.....	127
experiments by United States.....	71	Haywood, Benj., rearing of foxes	
laws <i>re</i>	40	by.....	13
Fur market at London.....	105	Henley-on-Thames, marten farm	
Fur News Magazine, on diminish-		at.....	78
ing fur supply.....	5	Holt, Renfrew & Co., fox ranch	
on skinning.....	97	of.....	13, 114
Fur News Publishing Co.....	56	Hoofed animals.....	10
Fur prices, statistics of.....	146	Hudson's Bay Co.....	104
Fur produced, annual value of....	138	auctions, fur prices at.....	147
Fur production, statistics of.....	138, 139	fur sales, 1850-1911.....	148-159
Fur sales, London.....	105	Hudson Bay seal.....	6
of Hudson's Bay Co., 1850-1911	148	Hunter-trapper age, passing of....	9
Fur-seals, importations of, to		Hunting of fur-bearers, keenness of	3
London.....	145	Huth, F., & Co.....	105

FUR-FARMING IN CANADA

I	PAGE		PAGE
Identification marks on foxes.....	45	Lopp, W. T., reindeer travel by..	134
Imitations of furs.....	7	'Lynx, black'.....	6
of silver fox skins.....	52		
Importations of blue foxes to Can- ada.....	56	M	
of furs to London, 1855 and 1875.....	143, 144	Mammals, wild, objects of breed- ing of.....	119
Increase of foxes, rates of.....	52, 54	in Canada, three orders of.....	11
Indigestion in foxes.....	43	Mange in foxes.....	42
Island site for fox ranch.....	28	Manufacture of furs.....	96, 102
		Maritime Provinces, foxes import- ed into.....	1
J		Marten.....	78, 128
Jackson, Dr. S., introduction of reindeer through.....	92	habits of.....	78
Judge, James, on blue foxes.....	60	popularizing the.....	6
		skins, production of.....	79
K		Mating of foxes.....	17, 39
Karakule.....	9	Meat fox diet.....	37
Keeper, experienced, necessary in fox ranching.....	39	Mendel's law.....	19
Kennel, fox, construction of.....	35	Menier, M., fox breeder.....	14
Killing foxes—See <i>Slaughtering</i>		Mink.....	71, 128
Killing of fur-bearers.....	97	Mink-farming.....	72
Kiver, H., & Co.....	105	practical hints on.....	77
		Mink, food of.....	75
L		pens.....	76
Labelle, Compagnie Zootechnique de.....	72	popularizing of.....	6
Labrador, reindeer in.....	93	Mink-ranching, methods of.....	73
foxes.....	24	Misnaming furs.....	7
Lampson, C. M., & Co.....	105	Montague, P. E. I., foxes near....	53
sales of.....	108	Montmorency Falls, fox ranch at..	13
Lantz, species of mammals on the earth.....	10	Moose.....	95
Laurentian plateau, expensive pelt from.....	71	Moravian mission reindeer.....	132
Legislation, Canadian, <i>re</i> fur-farm- ing.....	135	Moths on foxes.....	44
Lethal chamber.....	47	Muntjac.....	120
London, importation of furs to, 1855 and 1875.....	143, 144	Musk-ox, in London fur sales.....	3
Chamber of Commerce, permis- sible fur descriptions.....	8	Muskrat.....	89
fur auction, typical prices.....	147	Muskrat-ranching.....	90
fur market.....	105	Muskrat, rise of, in popularity....	6
Zoological Society.....	121	Muskrat skins, prices of.....	89
		N	
		Natural plan of mink-ranching....	73
		Nesbitt, A. and W.....	105
		furs sold by, 1905-12.....	142
		Nests for foxes.....	35
		New Brunswick, fur-farming legis- lation of.....	135
		Newfoundland foxes.....	24
		North American Commercial Co..	69
		Northwest, reindeer in.....	94

Index

O	PAGE
Oliver, Hon. F., introduction of reindeer by.....	94
Ontario, beaver supplied by Government of.....	91
fox-ranching in.....	13, 24
Open method of skinning.....	97
Options on foxes.....	49
Otter.....	127
Canadian.....	80
general characteristics of.....	81
habits of.....	82
numbers not decreasing.....	81
Otter-ranching.....	84
Otter skins, prices of.....	80, 82
Otter, the, as a fur-bearer.....	80
Oulton, Robert, pioneer P.E.I. fox breeder.....	14
Over-fur.....	96
Over-hair.....	96
Ownership of escaped fox.....	45

P	
Paddock for fox ranches.....	34
Paquet Bros., fox ranch of.....	13
Parasitic fox disease.....	45
Parks, national, value of.....	116
Pekan.....	79
Pelts—See <i>Skins</i> .	
Pelts, decreasing numbers of.....	4
increasing prices of.....	4
Pennant marten.....	79
Pens, fox, arrangement of.....	36
fox, construction of.....	33
Persian lamb.....	6, 9
Piastre Baie, fox ranch at.....	13
foxes near.....	53
Plucked skins.....	97
Poisons for killing foxes.....	47
Polar fox—See <i>Blue fox</i> .	
Polar fox.....	56
Popularizing furs.....	6
Port Elgin, N.B., foxes near.....	53
Pribilof islands.....	57, 58, 60
Price of black fox skins.....	2, 114
of black fox skins, average.....	111
of black fox skins, highest.....	51, 111
of black fox skins, lowest.....	52

Price of black fox skins (cont'd)	PAGE
of black fox skins, ultimate.....	54
of beaver skins.....	91
of foxes, rise in.....	49
of furs, statistics of.....	146
of mink skins.....	72
of muskrat skins.....	89
of otter skins.....	82
of red fox skins.....	23
of skunk skins.....	85
Prices received by C. Dalton for fox skins.....	112
by J. S. Gordon for fox skins.....	113
Prime skins, how to detect.....	96
Prince Edward Island, climate of.....	25
early fox breeders in.....	15
importation of foxes into.....	24
price of fox skins from.....	111, 114
Ptomaine poisoning of foxes.....	44

Q

Quarantine of foxes.....	55
Quebec, fox-ranching in.....	13
fur-farming legislation.....	135
city, foxes near.....	53

R

Raccoon.....	70
Ranches, fox, in Canada.....	53
Ranching, fox, practice.....	25
Rayner, James, P. E. I. fox breeder.....	15
Rayner, Silas, early P.E.I. fox breeder.....	15
Registration of foxes.....	55
Reindeer.....	92
in Alaska.....	131
for draught purposes.....	134
introduced into Labrador.....	93
loaning of, to natives.....	132
in the Northwest.....	94
skins, uses of.....	133
Re-naming furs.....	6
Revillon Frères.....	104
fox ranch of.....	13
Richardson, C. D., on value of wild animals.....	115
Rickets in foxes.....	43

FUR-FARMING IN CANADA

	PAGE		PAGE
Robertson, Dr., an early fox breeder.....	14	Thompson, E. S., on blue foxes...	57
Rodents.....	10, 89	Transportation in the Arctic.....	92
Roseberry, C. H., on Virginia deer	117	Tuplin, Frank, early P.E.I. fox breeder.....	15
Ross, Dr. Alex., on fox diseases..	42	Tuplin, James, early P.E.I. fox breeder.....	15
Russia, demand for black fox skins in.....	53		
S		U	
Sable, American.....	78	United States, introduction of reindeer into.....	92
Russian.....	12	Gov't fur-farming experiments.	71
Sales, Lampson.....	108		
Sampson, fox.....	41	V	
Savage island, Oulton fox ranch on	14	Vegetable fox diet.....	37
Sea-otter.....	12	Virginia deer, breeding of.....	124
importation of, to London....	145	experiments with.....	118
Sheep, possibility of crossing karakules with.....	10		
Silver fox—See <i>Black fox</i> and <i>Fox</i>		W	
Single-pen system of mink-ranching.....	75	Wapiti, domestication of....	121, 122
Skinning, methods of.....	97	Water-fur.....	96
Skins—See <i>Pelts</i> .		Weasel family.....	71
Skins, colours of, esteemed natural.....	100	Weight of furs.....	103
methods of curing.....	98	Westmorland county, N.B., absence of limestone in.....	25
dressing of.....	101	Whelpley, J. D., on London fur sales.....	106
manufacture of.....	96	White foxes.....	67
marketing of.....	99	Wire, ranch.....	29
sales, annual, of.....	104	price list of.....	30, 31
Skunk.....	85	Woodland ranches, advantages of.	27
habits of.....	88	Worms in foxes.....	43
pelts, classification of.....	85	Wyoming, Ont., fox ranch at....	13
ranching.....	86	foxes near.....	53
skins, prices of.....	85		
use of, increasing.....	6	Y	
Slaughtering foxes.....	46, 47	Yakutsk, sables in.....	12
Speculation in foxes.....	49, 50	Yukon foxes.....	24
Springy pelts.....	48		
St. George island, blue foxes on,..	57	Z	
St. Joseph-d'Alma, fox ranch at..	13	Zebra, domestication of.....	120
Statistics of fur prices.....	146	Zeh, L. E., on reindeer in Alaska.	131
of fur production.....	138	Zoological parks, demand for game for.....	116
Stevenson, Chas. H., on manufacture of furs.....	102	Zoological Society, London.....	121
Stretching of skins.....	98		
boards.....	99		
Summerside, P.E.I., foxes near..	53		
Surgery for foxes.....	44		
Swamps, drainage of.....	3		

